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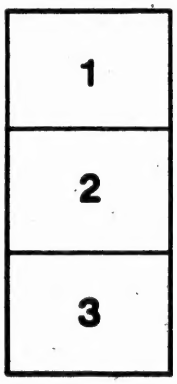

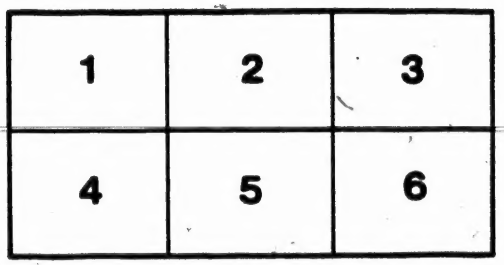

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ESTABLISHED, 1861.

JOHN BERTRAM & SONS'

Illustrated Catalogue

OF

MACHINISTS' TOOLS

AND

Wood Working Machinery.

MANUFACTORY:

CANADA TOOL WORKS

DUNDAS, ONTARIO.

DUNDAS, ONT.:
PRINTED AT THE "STANDARD" OFFICE, KING STREET.
1886.

ATIONAL EXHIBITION
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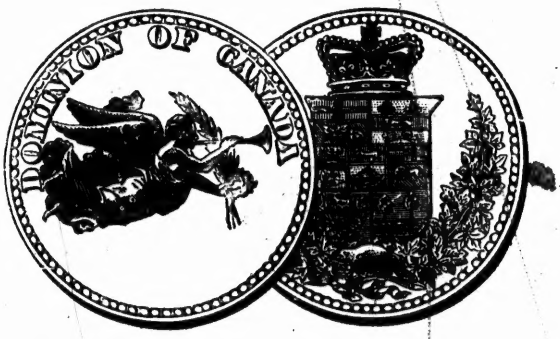
COMMISSION
DELPHIA, MDCCCLXXVI


DOMINION OF CANADA

Canada Tool Works.

Dundas, November, 1886.

To our Patrons in the Dominion of Canada:

Dear Sirs:—Having assumed control of the Canada Tool Works, Dundas, formerly conducted under the title of McKechnie & Bertram, we beg leave to state that having been closely identified for the last twenty-three years with the mechanical management of the above firm, and being thus thoroughly acquainted with all the details of a class of machine tools and wood working machinery that has attained a world-wide reputation, we assure our friends and patrons in the Dominion that we will spare no effort on our part to keep up, and materially improve, the standard of our productions to the requirements of the Locomotive and Car Shops, or the endless variety required in the Machine Shop, Agricultural Implement, and Sash Factory; and, while giving close attention to the management of the works, the principal or any member of the firm will always be ready to visit and consult with parties requiring machinery in our line; and recognizing the principle that the special need of the customers is of the first importance, we will always endeavor to meet them with such inventive skill as we can command.

Your respectfully,

JOHN BERTRAM & SONS.

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INTRODUCTION.

WE take this opportunity to express to our friends and customers our sincere thanks for the very liberal patronage they have bestowed on us for the last twenty-five years. During this period we have been engaged in manufacturing Machine Tools and Wood Working Machinery, and constantly adding to and improving our machines to meet the new and increasing wants of the public It has been our aim and ambition, as the pioneers of this branch of business in Canada, ever to stand foremost among the numerous competitors for public favor and patronage. How we have succeeded in accomplishing this is not for us to say; we leave it to the judgment of a public which we have ever found fully appreciative of our endeavors to meet the demands of the trade. With our long experience and our practical personal knowledge of the business, added to the fact that we have always in our employ talent second to none in the country, constantly engaged in perfecting and improving the different machines, we can with confidence recommend our goods as complete in every respect, and unsurpassed either in improvements or workmanship. We are bold to make this statement, strengthened as we are, and always have been, by the testimony of some of the most practical men in the country.

Every machine we build is what it is represented to be. Each machine is put together and tested on the work it is designed to do before leaving the shop, thus giving us the best evidence, that of actual use, that it is perfect.

We use none but the best of material in the construction of our machinery; the Castings are made of Scotch and Canadian Pig Iron, which insures strength and durability, and all fast running spindles are made of the best English Steel.

We have great pleasure in drawing the attention of our friends and customers to the fact of our success at the International Exhibition at Philadelphia, our firm being awarded a diploma and Bronze medal for our Wood Working Machinery and Machinists' Tools. Also a Canadian Diploma and Silver Medal awarded by the British judges for Engineers' tools.

The late Improvements we have made in all our new machinery having placed them in advance of anything in the market, and which are acknowledged by all, warrant us in confidently recommending them to our Canadian customers for finish, durability, and the quality of work they turn out, and as practice is the true test of every machine, parties desirous of purchasing can have any of them put in operation at our factory.

We beg to draw attention to our list of Locomotive and Car machinery of new and improved patterns, specially adapted to the construction of all Railroad and Car machinery, and of which photographs with description can be forwarded.

We further assure our friends and customers that we intend in the future, as we have done in the past, to give our undivided personal attention to the manufacturing of our machinery, so that the work shall be done in the most thorough manner, such improvements being made, from time to time, as will add to the efficiency of our machinery, and enhance its value to our customers.

McKECHNIE & BERTRAM.

Correspondents should be careful to give their names and addresses plainly and in full.

Parties ordering machinery should give shipping directions with care; and name route by which they wish it sent, and if they have any preference; otherwise we shall ship it by route considered most expeditious and safe.

RULES

FOR

CALCULATING THE SPEED OF DRUMS OF PULLEYS.

PROBLEM I.

The diameter of the driven being given, to find its number of revolutions:

Rule—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven.

PROBLEM II.

The diameter and revolutions of the driver being given, to find the diameter of the driven that shall make any given number of revolutions in the same time:

Rule—Multiply the diameter of the driver by its number of revolutions and divide the product by the number of revolutions of the driven; the quotient will be its diameter.

PROBLEM III.

To ascertain the size of the driver:

Rule—Multiply the diameter of the driven by the number of revolutions you wish it to make, and divide the product by the revolutions of the driver; the quotient will be the size of the driver.

RULES

FOR

CALCULATING THE PITCHES OF SCREWS TO BE CUT, ETC.

1st—Ascertain the ratio of any series of wheels thus: Multiply the whole of the driven wheels together, which will give the total number of teeth in the series. Then divide the result by the driving wheels multiplied into each other. The quotient will be the number of times the first wheel will revolve to the last. Suppose a wheel of 20 teeth to be driving a wheel of 100 teeth, to which is attached a wheel of 30 teeth driving a wheel of 150 teeth, and the ratio of the series be required,

$$\frac{100 \times 150}{20 \times 30} = 25 \text{ revolutions, the ratio of the series.}$$

This rule applies to single as well as compound gear.

2nd—To find the number of threads a series of wheels will cut: Multiply the ratio of wheels by the pitch of the leading screw.

A difficulty frequently arises in finding the number of threads to the inch or foot when a particular pitch or fractional number has to be matched. This can be easily ascertained by applying a scale to the screw, and by counting onward find what number of threads corresponds with an exact number of inches. Suppose 15 threads on the screw match 4 inches on the scale, consequently if 15 be divided by 4 it gives 3.75, the number of threads per inch; against that number on our screw-cutting tables will be found the wheels to cut it.

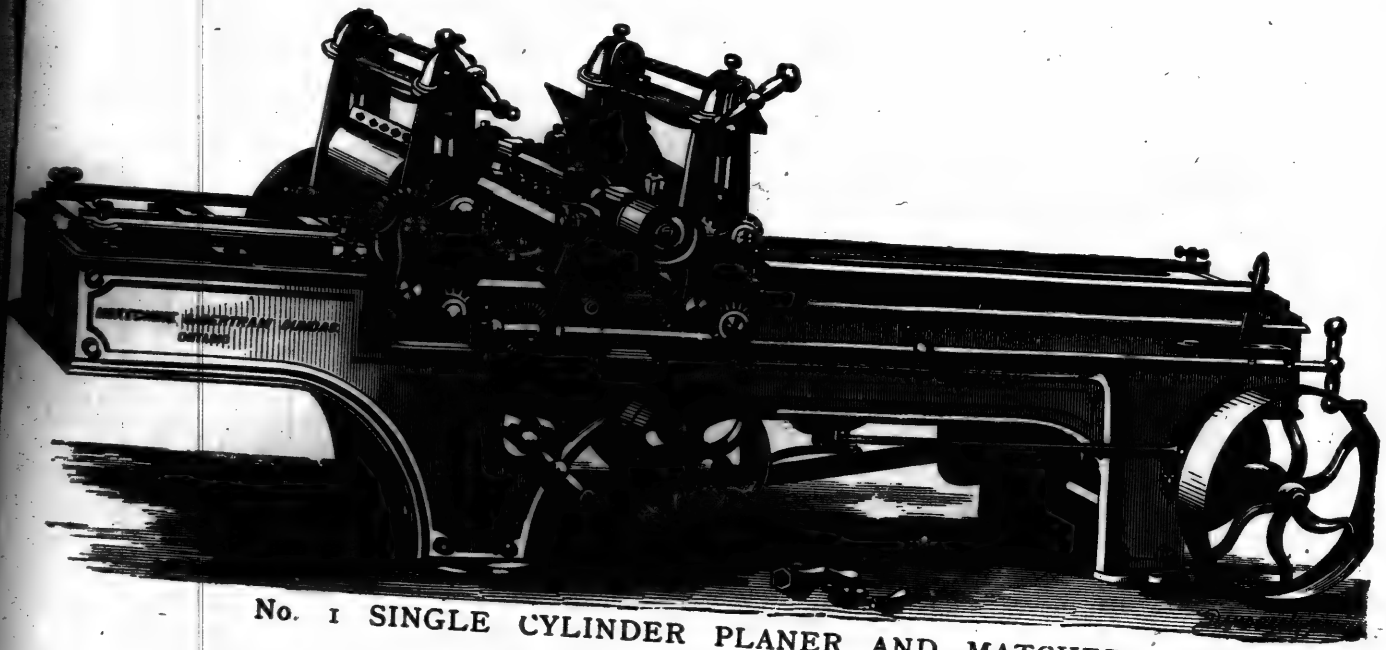
Wood Working Machinery.

WE beg to draw attention to the fact that in this line of machinery we have made many valuable and important improvements, and are constantly remodelling, designing, and adding to the general utility of this class of machinery. All our Wood Planing Machines are fitted with a

Solid Steel Forged Cylinder,

which has four slots, thereby allowing special sets of knives to be attached for doing mouldings, etc.; this of itself on these machines being a noteworthy feature.

We have, therefore, every confidence and great pleasure in recommending to the general public our Wood Working machinery, which has earned for itself a world-wide reputation, being awarded medals and diplomas both at home and abroad.



No. 1 SINGLE CYLINDER PLANER AND MATCHER.

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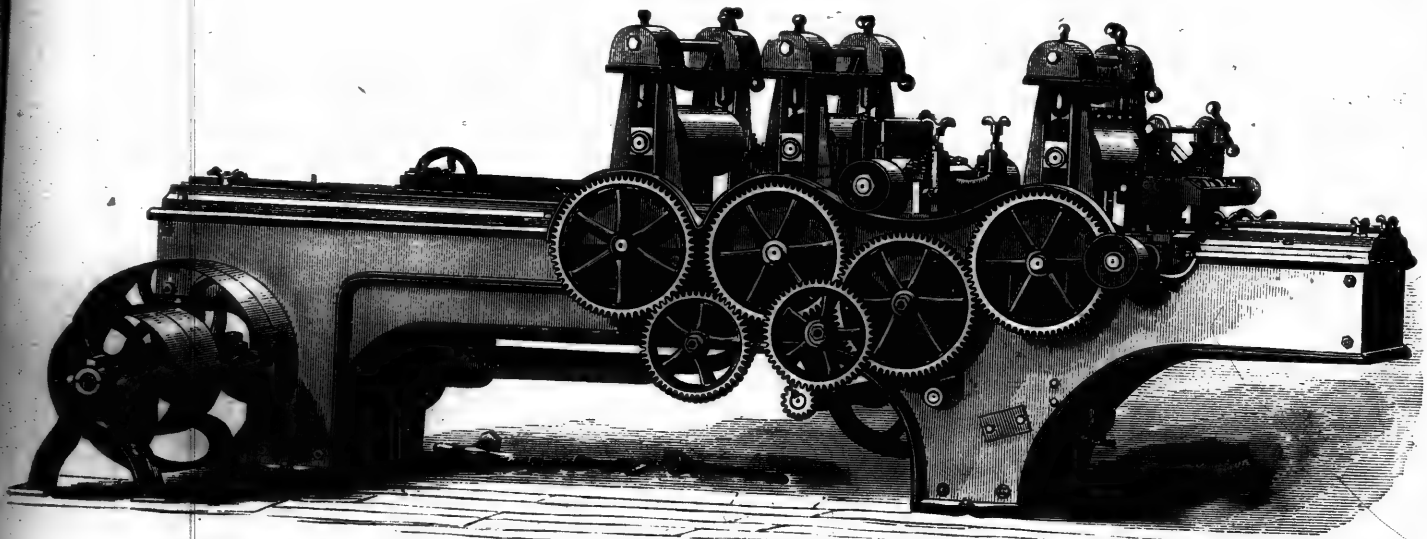
No. 1 Single Cylinder Planer and Matcher.

This is a heavy, strong and effective machine, and in the arrangement of its different parts cannot be equalled for durability and finish. The frame is 12 feet long, heavy and substantial, the rollers are eight inches in diameter and are connected with heavy extension gear. The cylinder is made from a solid steel forging, being slotted on all four sides, which allows of special cutters being attached for doing mouldings, etc; it has large arbors running in extra long self-oiling bearings, and is driven by two 5-inch belts.

The matcher spindles are of steel with long bearings, and the tops that carry the matchers can be removed in a few seconds for surfacing. The matcher heads are of bronze and carry 3 sets of knives each. The movable matcher is adjusted to any required width of board by a crank at the feeding end of machine in connection with a graduated scale.

The machine will surface 24 inches wide and match 12 inches wide and any thickness, up to 5 inches. The countershaft has tight and loose pulleys 15 inch diameter and 7 inch wide, and should revolve at 800 per minute.

Length of Belts for Cylinder, two of 17¾ feet, 5 inch face.
" " Matcher, two of 18 " 4 " "
" " Feed, one of 14¾ " 3 " "



LARGE SIZE, No. 1, DOUBLE CYLINDER PLANER AND MATCHER.

Weight, 8,000 Lbs.

WITH BEADING ATTACHMENT AND THREE SETS OF FEED ROLLERS.

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LARGE SIZE, No. 1, DOUBLE CYLINDER PLANER AND MATCHER.

Weight, 8,000 Lbs.

WITH BEADING ATTACHMENT AND THREE SETS OF FEED ROLLERS.

Large Size, No. 1, Double Cylinder Planer and Matcher,

WITH

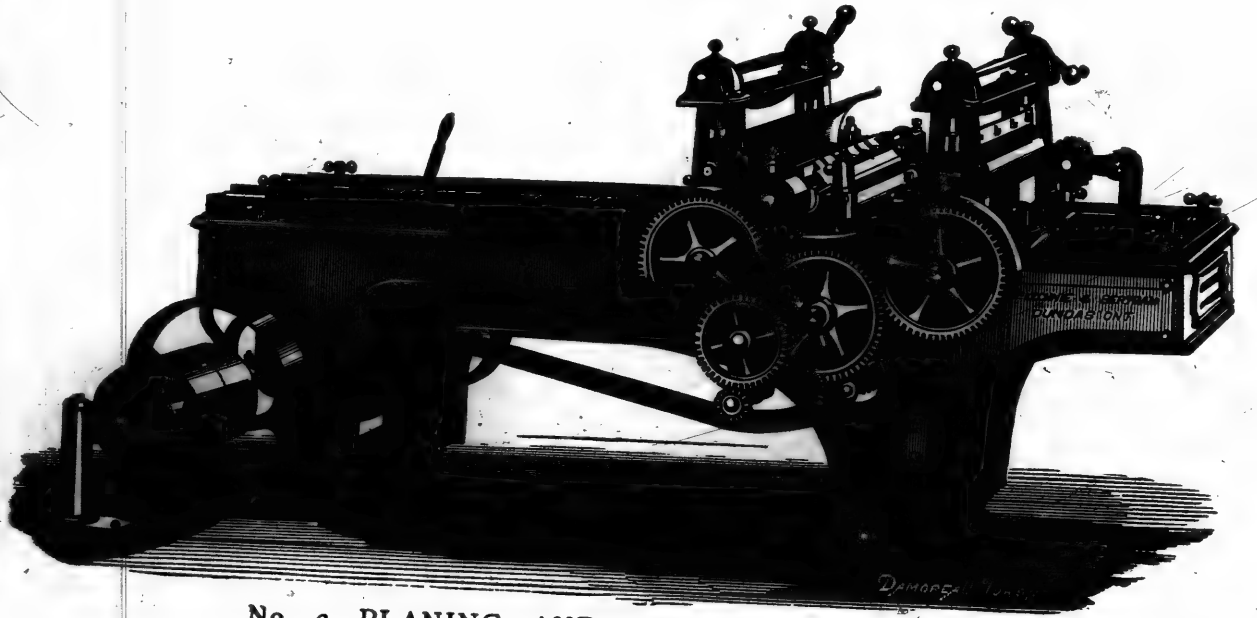
BEADING ATTACHMENT AND THREE SETS OF FEED ROLLS.

This machine has been perfected to meet the wants of large planing factories, and is confidently recommended to the public as the most powerful and complete machine made.

The Upper Cylinder is made from a solid steel forging, being slotted on all four sides, which allows of special cutters being attached for doing mouldings, etc., it has large arbors running in extra long self-oiling bearings and is driven by two 5 inch belts. The thickness of cut is regulated by a graduated scale from ⅛ up to 5 inches. The Under-Cylinder has 2 knives and has 2¼ inch steel spindle with long self-oiling bearings. The matcher spindles are of two inch steel, and have removable tops, when the machine is used as a surfacer. The matcher heads are bronze, and each carries 3 sets of knives—a patent chip-breaker of the most improved construction prevents slivering. The machine has 6 feed rollers, 8 inches diameter, weighted with levers and adjustible weights. It has, along with all our other planers, an improved Pressure Bar in front of cylinder. The movable matcher is operated by crank and graduated scale at feeding end of machine; this with our improved feed belt tightner, and all the shitting operations of the machine within easy reach of the workman. The countershaft has 15 inch tight and loose pulleys; 7 inch face; and runs at 800 revolutions per minute.

This machine is made with two sets of feed rolls if required; surfaces 24 inches wide, and matches 12 inches wide.

Upper Cylinder	Belts	two of	17¾	feet of	5	inch	Face.
Under "	"	one of	22¾	"	5	"	"
Matchers "	"	two of	18	"	4	"	"
Feed "	"	one of	14¾	"	3	"	"



No. 2 PLANING AND MATCHING MACHINE.

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No. 2 PLANING AND MATCHING MACHINE.

Weight 4,500 Lbs.

No. 2 Planing and Matching Machine.

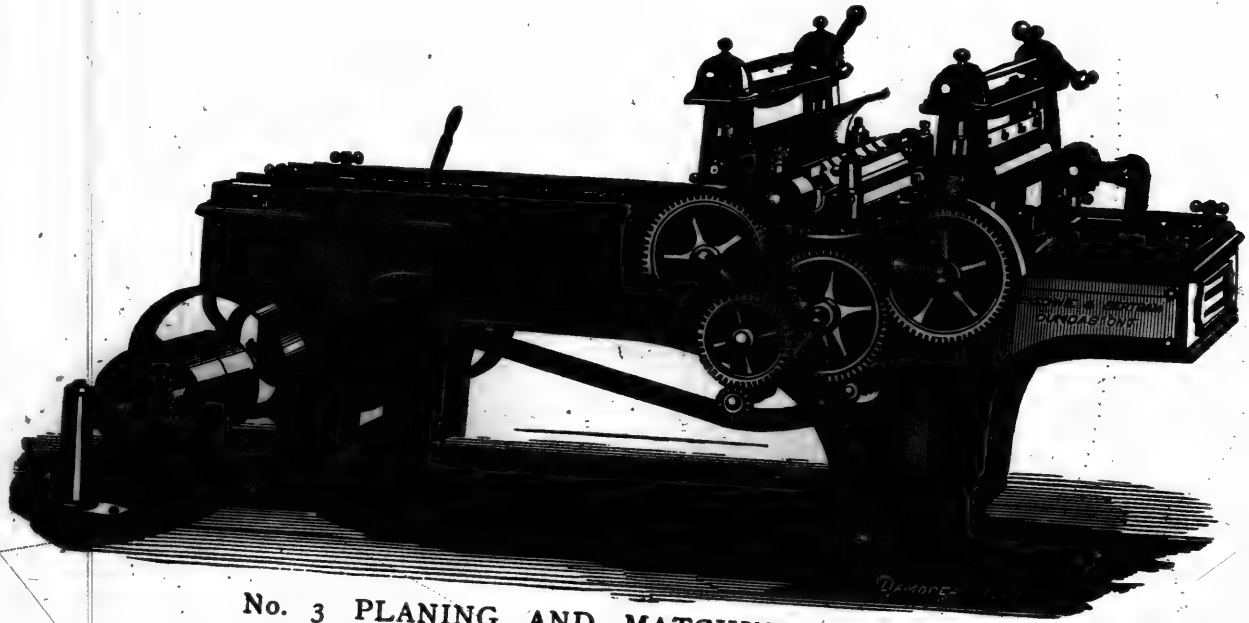
This machine, specially constructed for the wants of general workshops, has earned a deserved popularity while our firm has been before the public.

It has a strong and substantial frame. The cylinder is made from a solid steel forging, being slotted on all four sides, which allows of special cutters being attached for doing mouldings, etc.; it has large arbors running in long self-oiling bearings, the covers of which have adjustable screws which keep them up to the work while preserving rigidity in the bearing.

The matcher heads are of bronze, the spindles have long bearings which can be lowered instantaneously for surfacing. The movable matcher is operated by a crank and index at the feed end of machine. It has our improved feed belt tightener, 4 weighted feed rollers 6 inches diameter, pressure bar in front of cylinder, patent chip-breaker and graduated scale on cylinder-slide to guage the thickness of stuff from ⅛ inch to 4 inches. The countershaft has tight and loose pulleys 12 inches in diameter and 6 inches face and should make 800 revolutions per minute.

This machine is made with double cylinder and beading attachment if required, planes 24 inches wide and matches 12 inches.

Length of Belts for	Cylinder,	two of 15⅓	feet 4	inch face.
" "	Matcher,	two of 15⅓	" 3½	"
" "	Feed,	one of 13 1/12	" 3	"



No. 3 PLANING AND MATCHING MACHINE.

Weight 3,200 Lbs.

No. 3 Planing and Matching Machine.

No. 3 PLANING AND MATCHING MACHINE.
Weight 9,200 Lbs.

This machine has been constructed to meet the wants of a large class of purchasers in Canada—carpenters and builders, small planing mill owners, who do not wish to incur the expense of larger machines. From the fact that a great number of these planers are running in sections of the country where no pine is used, and effectually competing with American machines of a heavier build in the production of hardwood flooring of every description, we are safe in saying that for durability and rapidity of work, combined with its low price, this machine has no superior. It comprises nearly all the improvements of our larger machines.

The cylinder is double belted, and is made from a solid steel forging, being slotted on all four sides, which allows of special sets of cutters being attached for doing mouldings, etc.; has large arbors running in long self-oiling bearings, and is truly balanced. A graduated scale for thickness of stuff, from ⅛ to 3 inches is provided, and pressure bar in front of cylinder.

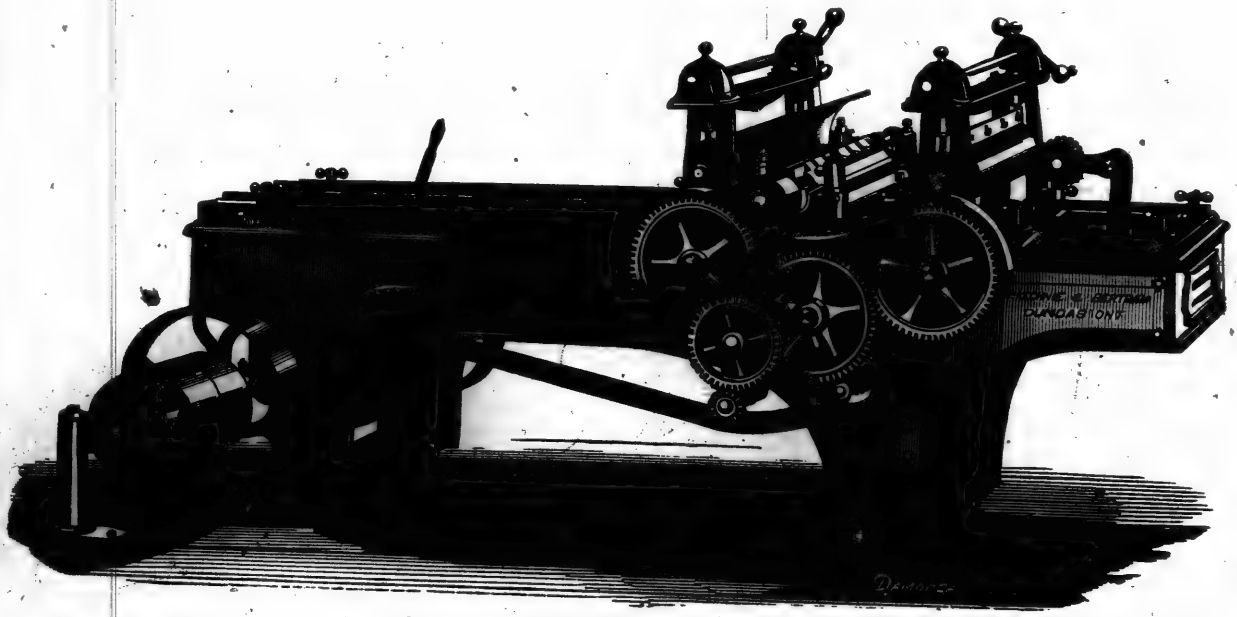
It has four feed rollers 5 inches in diameter, driven by expansion gearing and weighted with levers.

The matcher spindles are steel, with long bearings. All the bearings are lined with first quality babbit metal and are self-oiling.

This machine has improved feed belt tightener, and all the shifting operations are within easy control of the operator.

It planes 24 inches wide and matches twelve inches. The countershaft has 12 inches fast and loose pulleys; revolutions per minute, 800.

Length of Belts for	Cylinder,	two of $13\frac{8}{12}$	feet,	3½	inch face.
" "	Matcher,	two of $13\frac{8}{12}$	"	3½	" "
" "	Feed,	one [illegible] $11\frac{8}{12}$	"	2½	" "



No. 1 SURFACE PLANER.

Weight, 3,800 Lbs.

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No. 1 Surface Planer.

This machine has the same weight and build of frame as described on page 11. It has the advantage, for all kinds of heavy surfacing, over the generality of machines of this class, of having a long frame containing all the attachments requisite for a complete machine.

The cylinder has three knives, a steel spindle two inches diameter, with self-oiling bearings, and is driven by two belts four inches wide.

There is a pressure bar in front of the knives, and has two sets of feed rollers 6 inches diameter with powerful gearing and weighted with levers which give a strong feed to the machine, and our improved feed belt tightener gives the operator perfect control over its work.

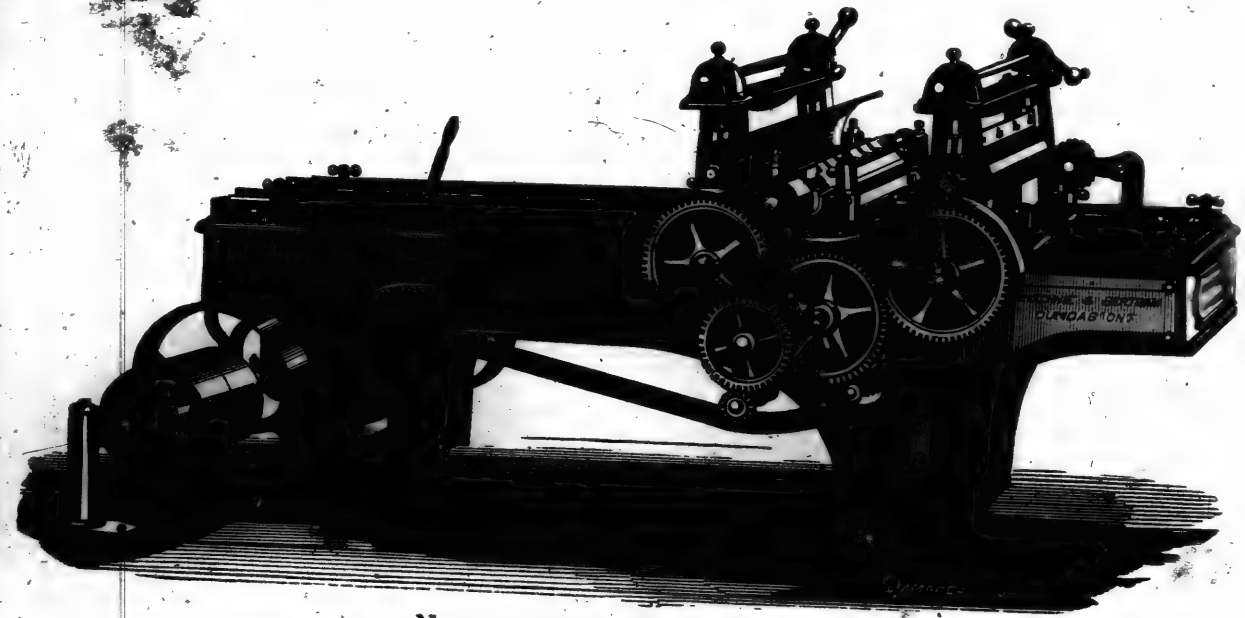
It planes 24 inches wide, and a graduated scale from ⅛ inch to 4 inches regulates the thickness planed.

This machine is made with one set of feed rolls if required.

The countershaft has tight and loose pulleys 12 inches diameter and should run at 800 revolutions per minute.

Cylinder Belts,	two of	$15\frac{4}{12}$ feet	and 4	inches wide
Feed "	one of	$13\frac{8}{12}$ "	3	"

No. 1 SURFACE PLANER.
Weight, 3,800 Lbs.



No. 2 SURFACE PLANER.

Weight, 2,600 Lbs.

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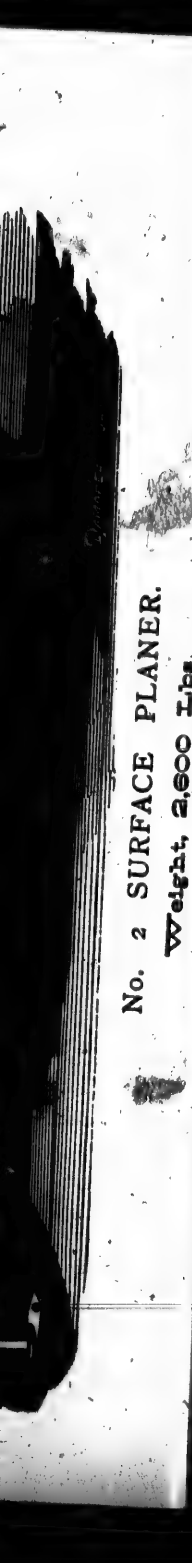
No. 2 Surface Planer.



This machine has the same proportions as our No. 3 planer and matcher described on page 15. With all the improvements of that machine, it forms for all kinds of surfacing the best offered to the public, while its comparatively low price places it within the reach of all.

It has a long frame and long driving belts, the frame containing the countershaft, a great advantage over most surfacers.

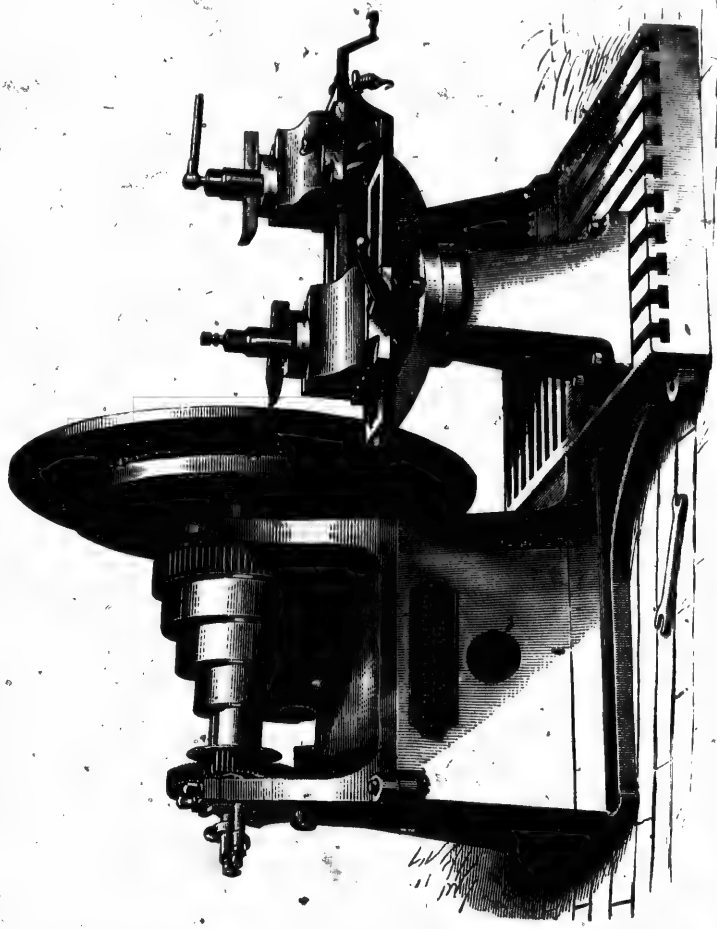
The cylinder has 2 knives, is double-belted, and has 1¾ inch steel spindle with long self-oiling bearings.

This machine is made with either one or two sets of feed rolls as required; these are 5 inches diameter and are weighted with levers.

A graduated scale shows the thickness of cut from ⅛ to 3 inches. Along with all our other planers the cylinder rises at right angles with the counter-shaft, thus keeping the belts the same length in any thickness of cut.

The countershaft has fast and loose pulleys 12 inches diameter and 6 inch face, and should revolve at 850 per minute.

Length of Cylinder Belts, two of 13½ feet, 3½ face.
" Feed " one of 11½ " 2½ "



No. 1 FACE LATHE, FOR TURNING AND BORING PULLEYS.

Weight, 11,000 Lbs.

Face Lathes for Turning and Boring Pulleys.

These lathes, of which we have two sizes, are specially adapted to the turning and boring of pulleys, facing, and turning large pistons and rings, and no machine shop is complete without such a lathe suited to its capacity. No. 1 consists of a foundation plate cast in one piece and carrying the main head and pedestals with compound slide rests.

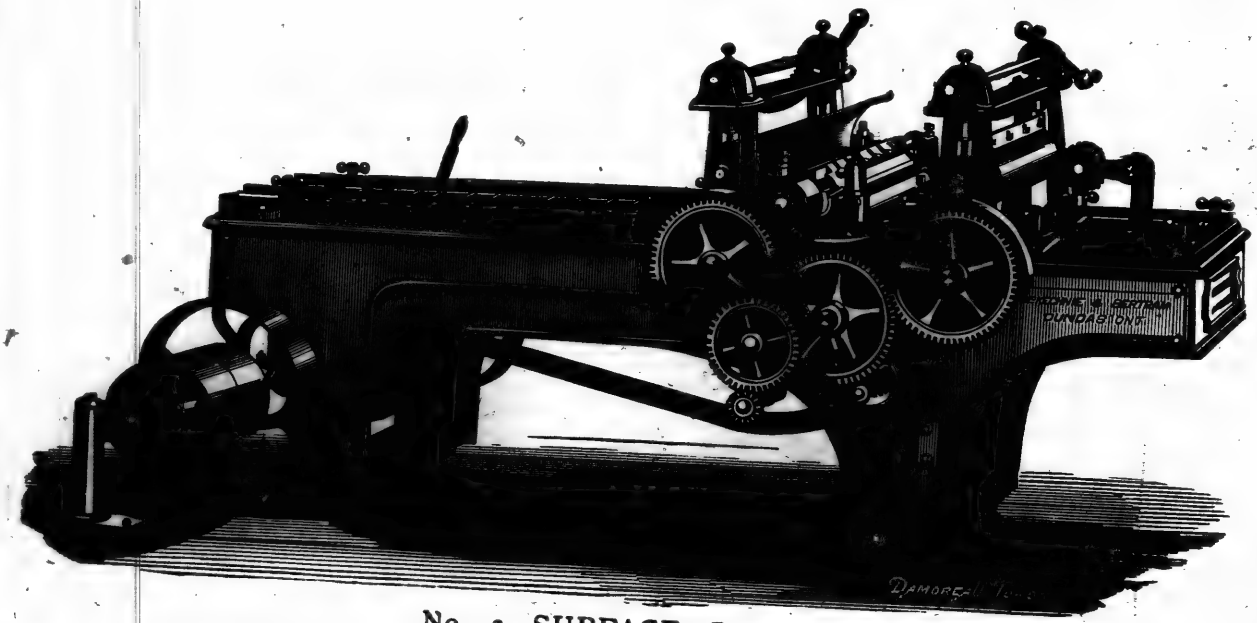
The head is triple geared, the last working into an internal gear on the face plate and imparting strong turning power. The motion can be momentarily changed from triple to single gear.

The spindle is cast-steel, 6½ inches diameter.

The foundation plate is slotted in front of the face plate, and suitable places are provided round it for bolting to stone foundation. Apparatus is furnished for imparting feed motion to the slide rests. This lathe turns a pulley 7 feet diameter and 24 inch face. Weight 11,000 lbs.

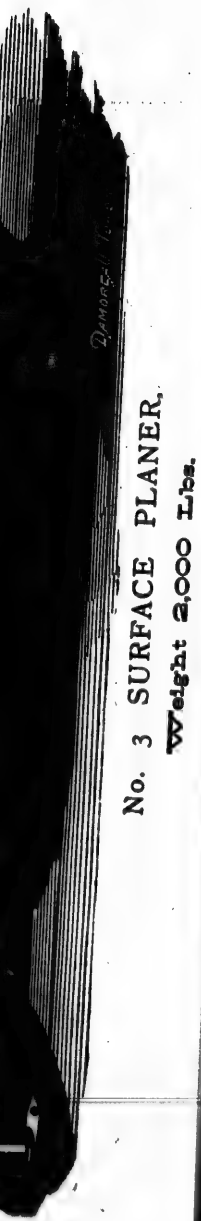
No. 2 is of the same style and description as No. 1, working with an internal gear, and turns a pulley 6 feet diameter and 20 inches face. Weight 6,000 lbs.

Pulleys on countershaft	No. 1,	24 in. diam.,	6 in. face,	revolutions	70
" "	No. 2,	18 "	5 "	"	100



No. 3 SURFACE PLANER.

Weight 2,000 Lbs.

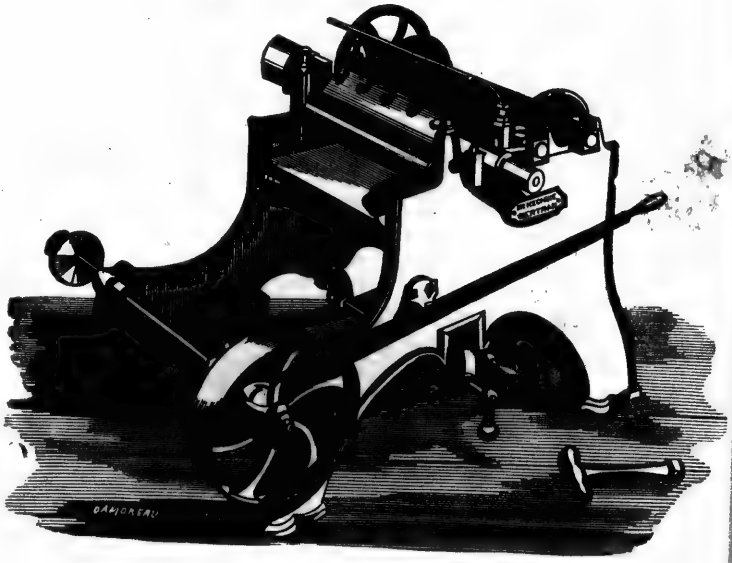


No 3 Surface Planer.

This machine is constructed on the same style as our No. 2 Surfacer, described on page 19. It combines all the improvements of our other surfacers. It is particularly adapted for shop work, for box makers, cabinet makers, or any kind of light planing, having a long cast-iron frame with self-contained countershaft; cylinder double-belted with steel spindle and self-oiling bearings; 4 in. feed rollers connected with heavy gear and weighted with levers, and with a pressure bar and roller close to the cylinder knives. This surfacer has no equal in turning out all kinds of hard and soft wood with great smoothness.

It planes 22 inches wide and 3 inches thick. The countershaft has tight and loose pulleys 12 inches diameter and 5 inch face, and should revolve at 850 per minute.

Length of Cylinder Belts, two of 13½ feet, 3½ face.
" Feed " one of 11½ " 2½ "



No. 4 SURFACE PLANER.

Weight, 1,000 Lbs.

NER.

No. 4 Surface Planer.

This machine is specially adapted for box, agricultural and fanning mill work, and is a valuable auxiliary to the pattern and workshop. It has a strong iron frame. The table is moved up and down by screws and is strongly secured to the frame by upright planed slides.

The upper and under rollers, 4 inches in diameter, are connected by expansion gearing and are weighted with levers.

The cylinder has two knives, and steel spindle 1½ inch diameter with self-oiling bearings.

It planes 20 inches wide and 5 inches thick, and has a graduated scale for the thickness of stuff.

The cylinder pulley is 5 inches diameter and 4 inches face, and should make 3,000 revolutions per minute.

Dimension Planer.

WOOD & GRAY'S PATTERN.

This planer has been perfected for the surfacing of thin lumber up to 24 inches wide, as well as for planing out of wind all kinds of heavy timber, and having the combined qualities of a Daniels planer and Woodworth surfacer, it is particularly valuable for agricultural implement makers.

It has been lately improved by making all the frame of cast-iron, which is planed true throughout, making it strong and substantial. The carriage is made of hardwood strips glued and bolted together.

The feed rollers work in a frame which swings on a hinge on the side of the bed, and can at any time be turned aside while the carriage is used for square stuff. They are heavily geared to the feed shaft and are connected by expansion gear. A plate on the carriage serves as a bed for surfacing, the end of the board is supported by a frame and roller while surfacing, and can be swung down out of the way while the carriage is used. When the machine is used for planing stuff out of wind as with a Daniels planer, the dogs, which are operated by a screw and hand-wheel, fasten the lumber down on the carriage so that it can be planed straight and out of wind, varying from ½ inch to 16 inches in thickness. The dogs are so arranged that stuff with oblique ends, or two peices of unequal length, can be held as firmly as if the stuff were square or of equal length. The carriage is so arranged that the feed can be stopped at any point. The side standards of cast-iron which carry the cylinder have planed sides inclined at right angles to the countershaft to allow the same length of belt for any thickness of stuff planed.

The countershaft has tight and loose pulleys 12 inches diameter and 6 inch face, and should revolve at 800 per minute.

No. O Large Inside Moulding and Matching Machine.

WEIGHT, 3,500 LBS.

This machine is specially adapted to turn out all kinds of flooring and ceiling and every description of moulding, from the most complicated down to the smallest, with the greatest rapidity and accuracy.

The upper cylinder or cutter head, which is slotted on 4 sides, is 12 inches long and of the best bronze, cast-steel spindle 1¾ inches diameter, and is driven by two belts 5 inches wide.

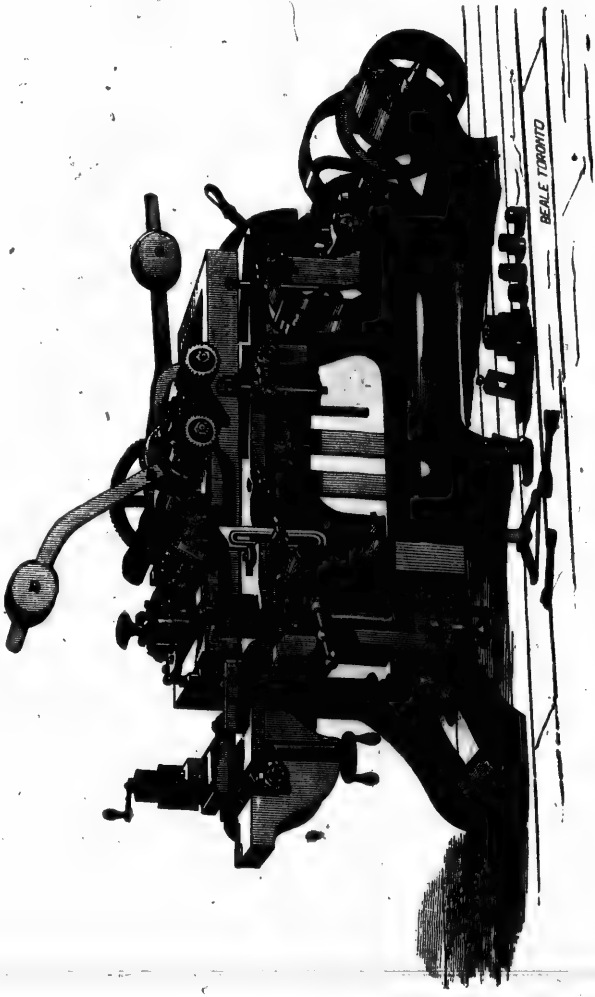
The side spindles are 1⅜ steel, with self-oiling bearings. The heads are slotted on 4 sides and both spindles raise and lower and turn to any angle.

The under cylinder is 4 slotted and of bronze, with cast-steel spindle and self-oiling bearings, and can be adjusted by screws and slides to any required cut; it is driven by a 5 inch belt. The end table can be raised and lowered with a screw to correspond with the cut of the cylinder, and the table can be removed for the adjustment of cutters.

A circular saw is placed here, if required, for splitting, when two lines of moulding are struck at one operation.

The feed rollers are 4 inches diameter, and geared together with expansion gear, and weighted with levers and weights. It has five changes of feed, ranging from 15 to 41 feet per minute. It planes flooring, ceiling, and all descriptions of car work on four sides.

The tight and loose pulleys are 12 inches diameter and 6 inch face, and should make 900 revolutions per minute, giving the heads 4,000.



No. 1 MOULDING MACHINE.

To Work Three or Four Sides. Weight, 2,800 Lbs.

No. 1 MOULDING MACHINE.

To Work Three or Four Sides. Weight, 2,800 Lbs.

No. 1 Moulding Machine, to Work Three or Four Sides.

By a reference to the accompanying cut it will be seen that this machine is of entirely new design, and differing in many respects from the class of moulding machines hitherto used. It has a compact and substantial frame of extra length, and the table is gibbed to the front in such a manner as to secure great rigidity to the machine.

The upper head has 1¾ steel spindle running in self-oiling bearings, while a bearing outside the cutter head and which is fitted in a recess on front of the table prevents all vibrations. The table is raised and lowered by a crank in front, thus effectually enabling the operator to shift the same while the machine is in motion without danger as in other machines.

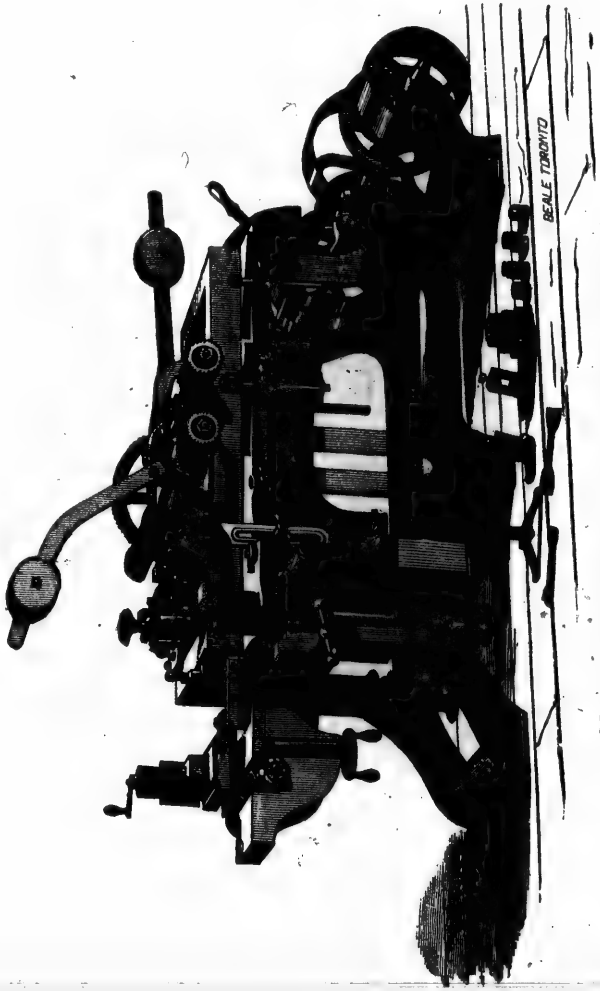
The under cutter head runs in a frame which can be raised and lowered to take any depth of cut. The slide spindles are of 1⅜ steel running in long bearings, the lower being bronze with adjusting screw to take up end play; both spindles can be raised and lowered while running to adjust the cutter to the moulding. They run in heavy brackets gibbed to the table and can be swung to any angle and set to any width of stuff while in motion.

The upper rollers are four inches in diameter, and in inch sections, while blanks are provided to work any single section when required. The under roller is geared to the upper with expansion gearing, and the latter raise and lower parallel with the table and are weighted with adjustable lever and driven with heavy gear. The feed has four changes and is thrown out of gear by a belt tightener. Plattens and springs are provided to press on any class of work.

This machine comprises the following advantages over all others:—The frame is 10 feet long, admitting of long belts. All the adjustable parts can be shifted while the machine is running; it is powerful enough for general tongueing and grooving, heading, ceiling, as well as mouldings 8 in. wide any thickness on all sides. All the cutter heads are of bronze and four-slotted.

Tight and loose pulleys on countershaft, 10 inches diameter and 6 inch face, and should revolve at 850 per minute.

Weight of machine complete, 2,800 lbs.



No. 2 MOULDING MACHINE.

To Work Three or Four Sides. Weight, 1,800 Lbs.

No. 2 MOULDING MACHINE.

To Work Three or Four Sides. Weight, 1,800 Lbs.

No. 2 Moulding Machine, to Work Three or Four Sides.

This machine is an exact counterpart of our No. 1 moulding machine described on page 27, and considering its capacity to take in 8 inches wide and 12 inches deep, it becomes a necessity to general builders and sash and door factories.

It has an extra long frame planed and fitted substantially together, a rigid table gibbed to the front with a deep slide and a binder in the centre for extra security while turning out a long run of heavy work It raises and lowers by crank on the front.

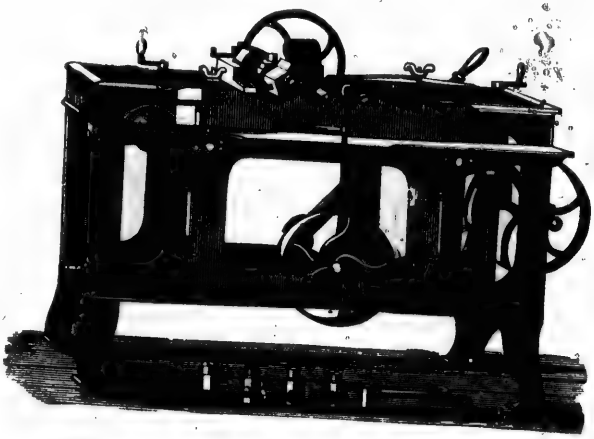
The feed rollers are driven by strong gearing, having four changes of feed. They raise parallel with the table, and with the under roller geared constitute a strong feed. They are in ¾ inch sections, with corresponding blanks to adapt them to any class of work.

The main cutter head spindle is 1⅝ inch steel, with long bearing and four-slotted bronze head and outside bearing attached to the table front. The spindle runs in a frame gibbed to the top of machine and has adjusting screws to move it endways, to shift the position of cutters.

The side heads are bronze and slotted. The spindles are steel with long bearings, the lower one being bronze with adjusting screw. They can be swung to any angle.

This machine has the following advantages: A long frame and table, long belts, and all the shifting parts to set the machine to any size of stuff. Can be altered while it is in motion.

The countershaft has tight and loose pulleys 10 inches diameter and 5 inch face which should make 850 revolutions per minute.



No. 3 SASH AND MOULDING MACHINE.

Weight, 550 Lbs.

G MACHINE.

No. 3 Sash and Moulding Machine.

This machine has been long and favorably known to the public, and has earned a first-class reputation in the sash factory. While its cheapness brings it within the reach of the smallest business of the country, it is at the same time indispensable in the large establishment as an auxiliary for special lines of moulding along with larger machines.

It has a strong iron frame planed on all the depth of front; the table is raised and lowered by two screws.

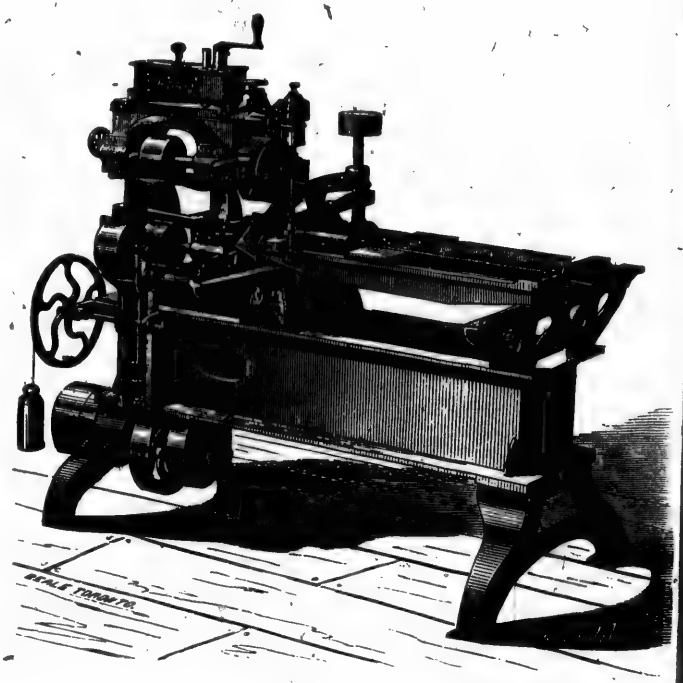
The rollers are in sections, grooved and case-hardened, and there are three changes of feed.

The cutter head spindle is of 1½ steel, and has screw for end adjustment. With this machine are furnished 5 heads, viz.: a planing head with 8 inch knives, two moulding heads 2¼ inches, one 2½ and one 4 inches, with brass caps and case-hardened set screws, and ten sets of cutters to suit the various heads.

To this machine has been recently added a number of valuable improvements. A weighted platten in front of the cutter head which can be swung back for the adjustment of cutters on the same style as our Nos. 1 and 2 moulding machines.

It has a new style of pressure spring which can be shifted to press on any part of the moulding as it passes from the cutter head. It has lso the usual side springs, wrenches, etc.

The countershaft has tight and loose pulleys 8½ inches in diameter and 3½ inch face, and should revolve at 850 per minute.



IRON FRAME TENONING MACHINE.

Weight, 1,200 Lbs.

MACHINE.

Iron Frame Tenoning Machine.

FOR SASH AND DOOR WORK.

This tenoning machine, specially adapted for sash, door and blind makers, combines all the latest improvements on this class of machines.

The cutter heads both raise and lower simultaneously or independently. Each head has four knives so adjusted as to cut a tenon 6 inches long at one operation.

The spindles are steel, fitted so as to prevent end play. They run in frames gibbed securely to the uprights, and have end adjusting screws.

The cutter heads have saws instead of spurs. The machine has double copes which can be set to any required position. The belt which drives the cutter head spindles when once laced together requires no alteration, as a binding pulley operating against the loose side with a weight keeps the same strain on it in any position of the cutter head.

The carriage contains a wrought-iron slide, with attachments, which can be adjusted to any length of tenon. The carriage frame and upright standards are plain and substantial, and divested of the useless ornamentation so usual on these machines.

The fast and loose pulleys are 9 inches diameter and 4 inch face, and should make 800 revolutions per minute.

Punching and Shearing Machines.

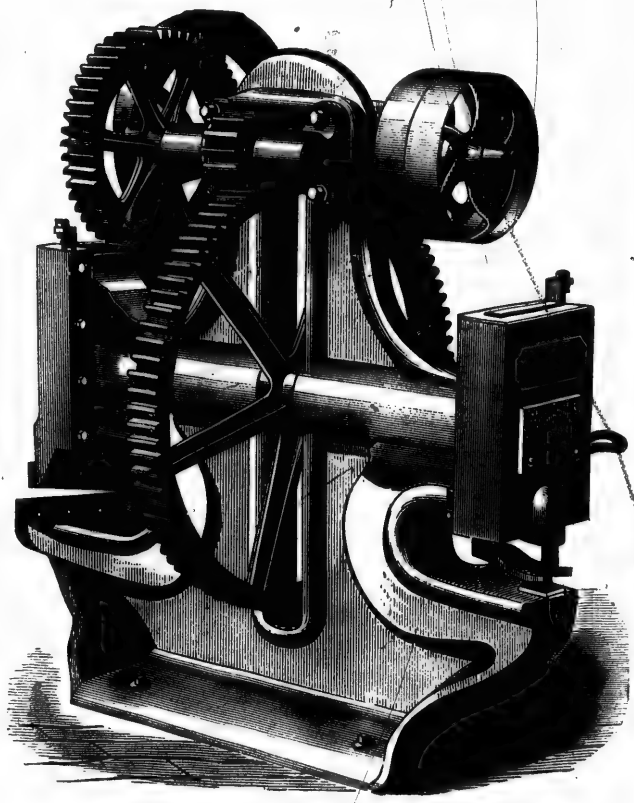
We manufacture in this line of machinery quite a variety of different styles and shapes, both of single and combined machines. If required, photograph of any of these may be had on application.

No. 1 Punch and Shears.

The accompanying cut represents our No. 1 combined punch and shears. It is single geared and can be worked by hand or power. The frame is massive and strong. The eccentric works with a bronze box.

All the parts of this machine are made heavy, to prevent the possibility of spring. It can be made with die block as in the cut, for implement makers, or otherwise for the boiler shop. It cuts and punches 5/8 in. holes and 1/2 in. plate.

Fast and loose pulleys 24 in. diameter, 5 1/2 in. face, revolutions 60. Weight 3,500 lbs.



No 2 COMBINED PUNCH AND SHEARS.

Wood Frame Tenoning Machine.

This machine has double or single cutters, as required, to cut either a 6 inch or 3 inch tenon. The frame is of the best seasoned hard wood lumber.

The carriage upon which the stuff to be tenoned is placed, is so constructed with gauges and stops that no setting out is required, and has a convenient apparatus for raising and lowering.

The upper or lower copes, either one or both, as may be wanted, are placed in the rear of the cutter heads, so that by extending the motion of the carriage both sides of the tenon are cut and coped at the same time.

The copes are on an independent cast-iron frame, and are not affected by any alteration of the main cutter heads, and are adjusted by screws to any desired position.

The cutter head and cope spindles are steel, and the heads have saws instead of spurs.

The tight and loose pulleys are 10 inches diameter and 3¼ inch face, and should make 400 revolutions per minute.

Upright Shaper or Moulding Machine.

This machine is calculated to perform work that can be done by no other machine now in use, cutting straight moulding, as well as the most irregular forms. It is an indispensable machine for saving labor in railroad, carpenter and machine shops, also in agricultural and cabinet factories.

A great many improvements not represented in the above cut have been added lately.

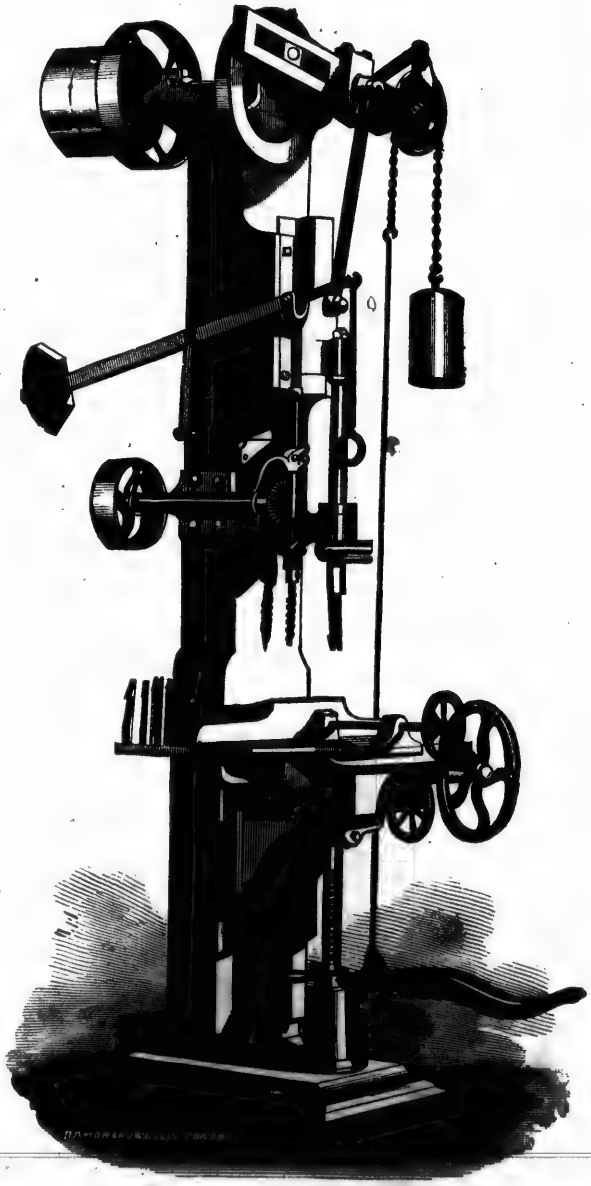
The spindles are steel with deep self-oiling boxes secured in an upright slide gibbed to the frame and capable of being raised and lowered by a hand-wheel on each side.

It has brass guards for operating with plain knives, which can be removed when moulding knives are used. In addition to this there is an adjustable safety guard over the heads, which can be set to any thickness of stuff.

The frame is strong and substantial with cast-iron table planed smooth on the top.

The spindles are perfectly true and balanced, and can be run as high as 5,000 revolutions per minute.

The tight and loose pulleys are 6 inches diameter and 5 inch face, and should make 950 revolutions per minute. Weight 600 lbs.



LARGE CAR MORTISING AND BORING MACHINE.

WITH AUXILIARY BORING ATTACHMENT.

Large Car Mortiser and Borer,

WITH

AUXILIARY BORING ATTACHMENT.

This machine, specially adapted for car and agricultural implement shops, possesses great power and capacity and in these respects has no equal in the market.

Recently an important improvement was effected on this mortiser, which is not shown in the accompanying cut, by connecting the outer end of the top lever to the crank plate by a rod having brass boxes, and which imparts to the chisel bar great power.

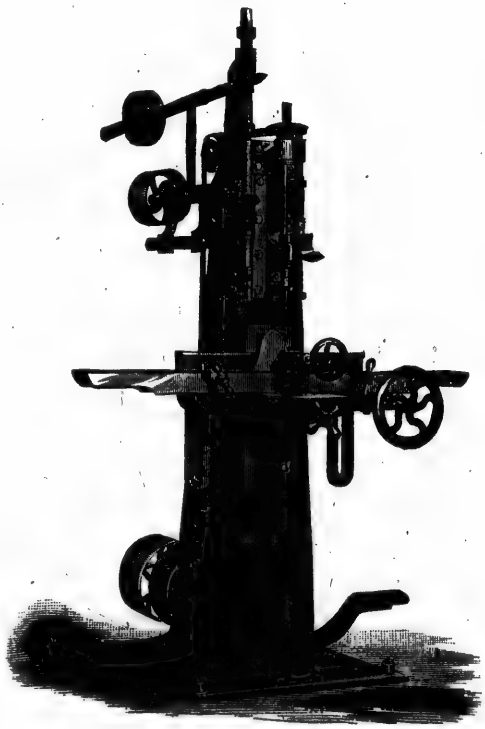
The chisel bar is drawn up and brought to rest by a weight acting on a movable slide on the top lever which brings the chisel bar connecting rod to the dead point, when a slight pressure of the foot on the treadle throws the slide and rod directly over the chisel and gives it a positive motion working without jar to the foot in the hardest timber.

The table is raised and lowered by a screw directly under the chisel and receives the shock of the blow on the bed plate. The column is heavy and rigid, which gives the machine perfect solidity. All the boring spindles, top shaft and chisel bar are steel.

When ordered the auxiliary boring attachment is gibbed to the right hand side of the column and is moved to any point of the table by a hand wheel. The table can be set to any angle required.

We furnish with this machine patent lip chisels as follows: ½, ⅝, ¾, ⅞, 1 inch, 1¼ and 1½, the same number and sizes Jennings bits for entering, and one set of long boring bits for the auxiliary attachments.

The tight and loose pulleys are 12 inches diameter and 5 inch face, and should revolve at 320 per minute. Weight 3,000 lbs.



NEW HIGH SPEED SASH AND DOOR MORTISER.

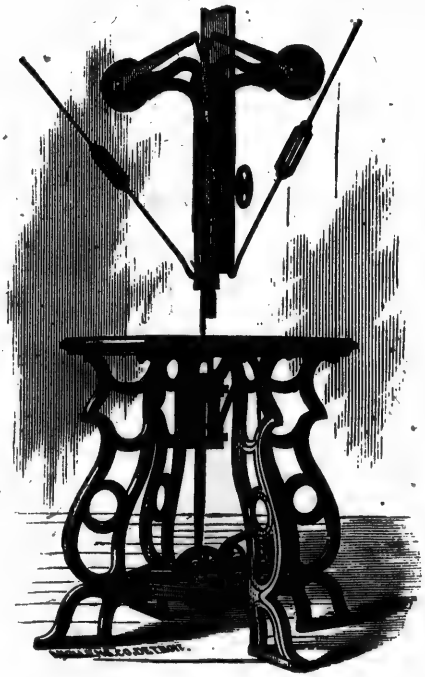
Weight, 1,300 Lbs.

New High Speed Sash and Door Mortiser.

This machine is of a new and improved pattern and is admirably adapted to meet the requirements of sash and door, cabinet and other similar shops. The main force of itself is cast in one piece in the shape of a hollow box; the crank which operates the chisel bar being located close to the base plate of the machine, thereby by this style of construction distributing the gyration to foundation on which it stands. This machine when securely bolted to a foundation does away with all overhead bracings.

The chisel bar has a uniform stroke of five inches and is automatically and instantaneously reversed by power. A very complete boring attachment is provided when required. The machine mortices from ¼ inch to ¾ inch; is constructed with great care and accuracy, as all reciprocating machinery should be, and is the most durable and efficient machine of the kind known at this time.

Fast and loose pulleys 12 inch x 4 inch, and should run at 450 revolutions per minute. Weight 1300 lbs.



SCROLL SAWING MACHINE.

DOWLING'S PATENT.

Weight, 800 Lbs.

Scroll Sawing Machine.

DOWLING'S PATENT.

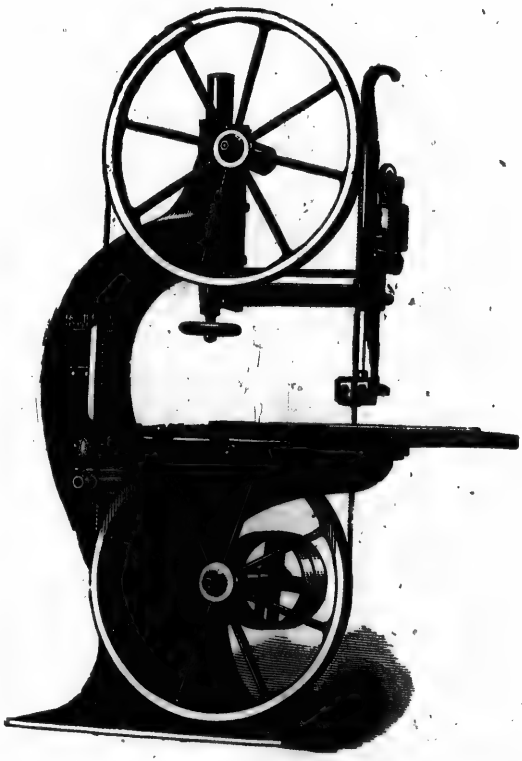
The scroll sawing machine is of recent invention, and is pronounced by firms of long experience now using it as the best in use.

Having purchased the exclusive right to manufacture this machine in the Dominion, we can confidently recommend it to the public as the most durable and effective machine of its class.

The saw has a constant strain through its whole stroke. This is effected by two spiral springs acting on steel levers which are attached to the upper slide direct, and all the reciprocating parts of this movement being made of steel-plate enables the machine to run at a high rate of speed with great smoothness. The slides are long and run in bronze.

The frame is heavy and solid, with wood top made of seasoned ash and walnut. The top slide can be raised and lowered to any thickness of stuff. A handle on the tension allows the operator to remove the saw instantaneously while cutting intricate work. The advantages of this machine are apparent, as it is adapted to the heaviest or lightest work.

The tight and loose pulleys are 7 inches diameter and 3 inch face, and should make 1,000 revolutions per minute.



No. 1 BAND SAW,

WITH 34-INCH WHEEL.

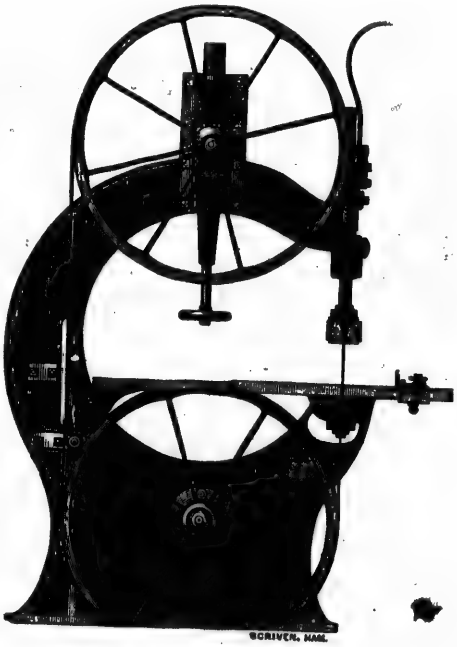
No. 1 Band Sawing Machine.

This cut represents our No. 1 Band Saw; as shown it has a tilting table, but can be made without if desired.

The wheels are of high-quality cast-iron, 34 inches diameter, evenly balanced and faced on rim with rubber bands.

The frame is of hollow or cord section and is very heavy, thus giving greater rigidity than any other form; the top wheel bearing has elastic compression, thereby preventing breakage of saws. This machine is of improved and substantial patterns; is of first-class workmanship, material and finish, and is of invaluable service to all wood workers.

Fast and loose pulleys are 14 x 4 inches and should run at 400 revolutions per minute. Weight, 1,500 lbs.



No. 2 BAND SAW,

WITH 40-INCH WHEEL.

No. 2 Band Sawing Machine.

This machine is constructed specially for car and railroad shops.

The frame of the machine is massive and cast with cored section and has a tilting table. All the improved features of the No. 1 machine are carried out in this.

The wheel is 40 inches diameter and is built on the same plan.

The fast and loose pulleys are 15 x 4 inches, and should run at 150 revolutions per minute.

PRICES

OF

Extras for Wood Machinery.

Cylinder knives, 24 inch, each	$ 4 00
" " 22 " "	3 75
" " 20 " "	3 50
" " 16 " "	3 00
" " 12 " "	2 25
" " 8 " "	1 75
Moulding machine knives, per inch face	50
No. 1 matcher heads (brass), per pair and 3 set cutters	32 00
No. 2 " " " " " 2 "	26 00
No. 3 " " (Iron), " " 2 "	22 00
No. 1 jointer heads (Brass), and 3 set 4 inch cutters	23 00
No. 2 " " " " 2 " 4 " "	28 00
No. 3 " " (Iron), " 2 " 4 " "	24 00
Matcher setter	8 00
Grinding machine for planer knives	12 00
Moulding machine heads, brass, 4 slotted, 8 inch	14 00
Side heads, brass, (each) 2 slotted	8 00
" " " 4 "	10 00
Moulding heads with brass caps, 2 to 2¼ inches wide	6 00
" " " " " 3 to 4 " "	7 00
" " " " " 5 to 6 " "	8 00
Panel heads with knives	7 00
Patent lip mortiser chisels, (each) ⅜ to ½ inch	2 00
" " " " ⅝ to ¾ "	2 50
" " " " ⅞ to 1 "	3 00
" " " " 1¼ to 1½ "	3 50

Saw Arbors.

Length over Bearings.	Diameter of Pulleys.	Hole in Saw	Diameter of Saw.	
20	4½	1	12	10 00
22	5	1 1/16	16	12 00
24	5	1 3/16	20	14 00

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.....	3 75
.....	3 50
.....	3 00
.....	2 25
.....	1 75
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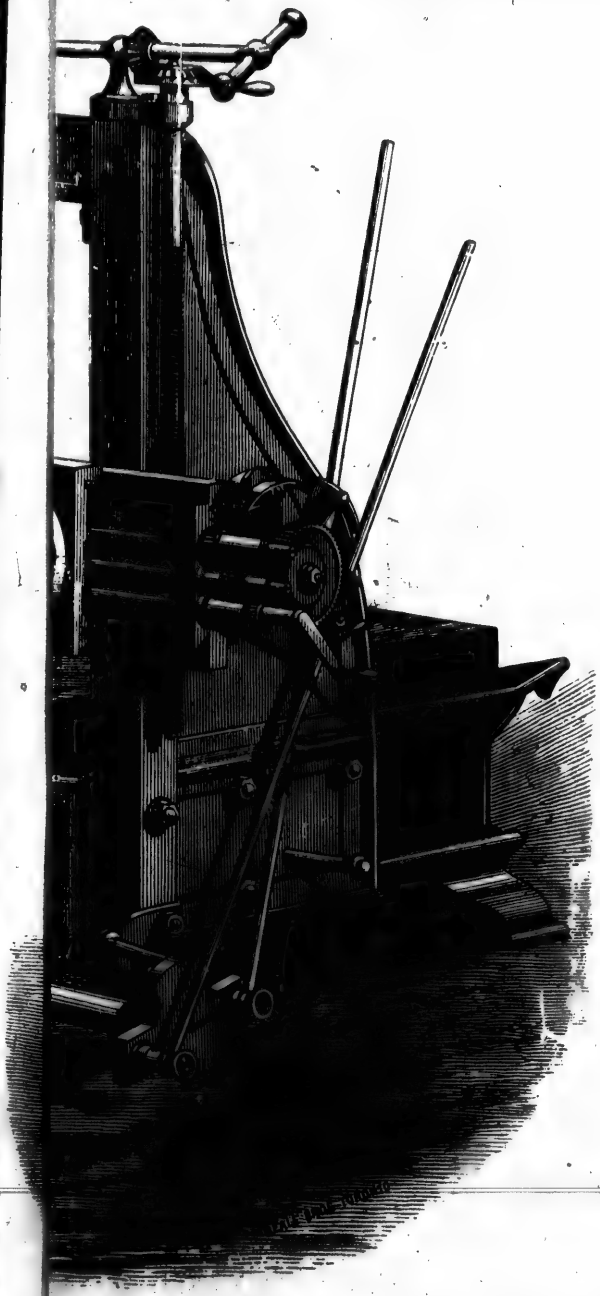
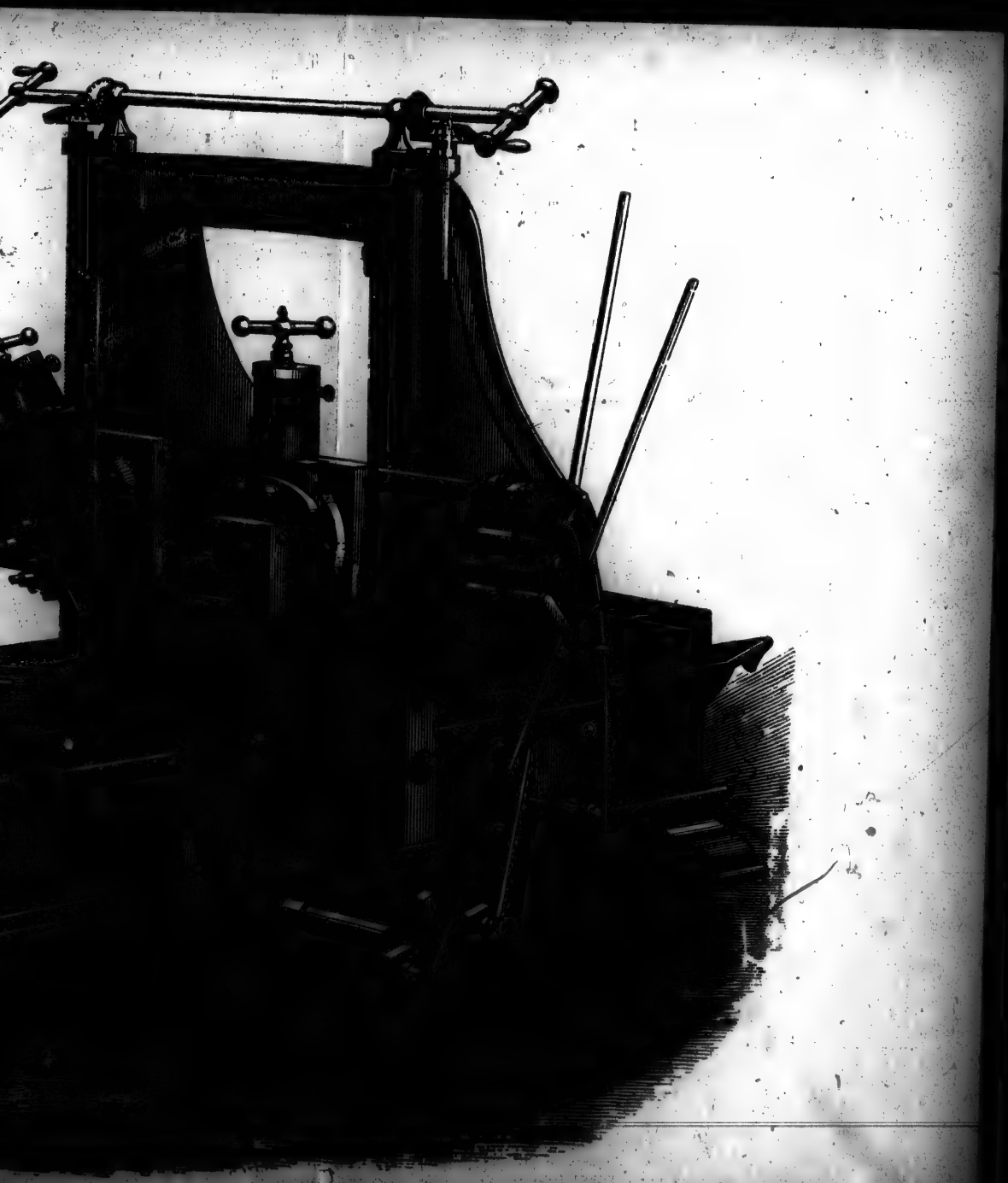


TWELVE AND SIXTEEN FEET IRON



FEET IRON PLANER

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Iron Planers.

We would draw particular attention to the improved style of our iron planing machines. The various illustrations of iron planers in this catalogue, by no means do justice to the style of machines we now build, as they have all been thoroughly remodelled, designed, and equipped, to meet the various requirements of high class tools.

All our iron planing machines have quick return motion, automatic and independent cross, down and angular feeds, when required, and are double belted, being provided with an automatic belt shifter, which in reversing shifts one belt before the other, thereby insuring a positive and easy change from back to forward motion without the usual jerking and jarring so common to the inferior style of machines made. We have, therefore, much pleasure and great confidence in being able to recommend and manufacture a class of machines, which for their high class workmanship, material, finish, and general utility, cannot be excelled.

Twelve and Sixteen Feet Iron Planers.

This cut represents our 12 feet 36 x 36 inch and 16 feet 44 x 44 inch iron planer, extra heavy, with two tool blocks and with down, cross and angular feeds and quick return motion on table.

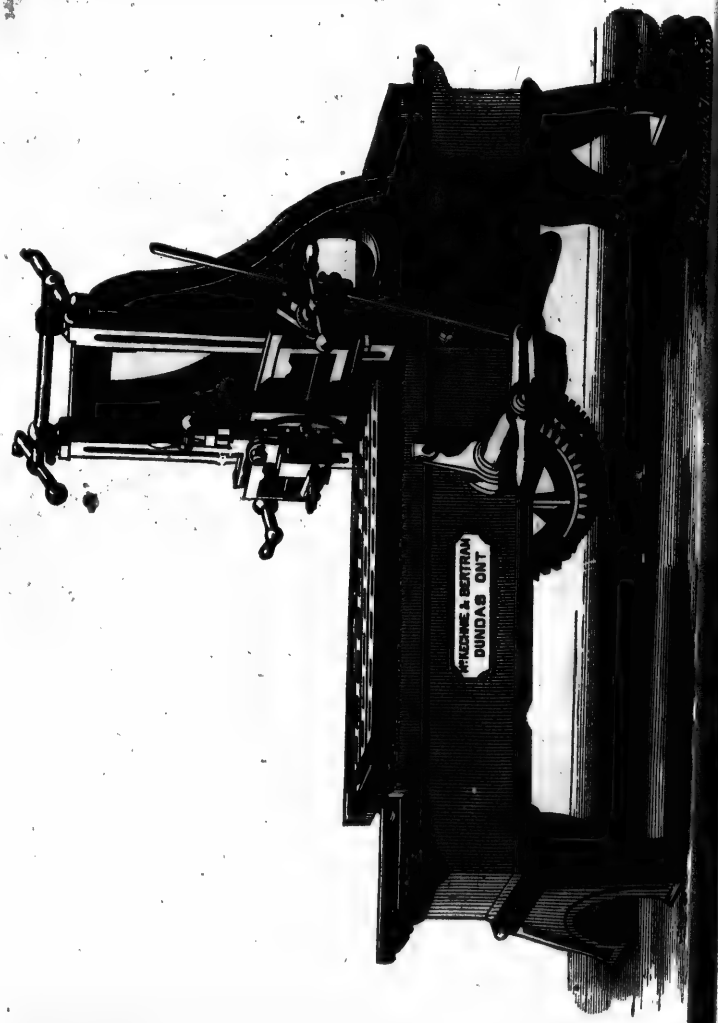
The gears are all cut, of large diameter and wide face. The feed gear is worked from a friction-plate and is conveniently situated in rear of cross slide leaving a clear way for the tool block. The reversing motion is positive, noiseless and without jar.

All the ways and slides are scraped to true bearings. The cross slide is square on top, and having the tool block returned over it effectually prevents spring in heavy cut; the belts have automatic shifters.

The shafts carrying the working gear are heavy, giving no possibility of spring. All the screws, the bolts and nuts on cross-slide and tool rests are case hardened, as well as all parts subject to wear.

On these planers two tool blocks can be worked if so ordered, and each with cross, down and angular feed, working independently. All the parts of these machines are heavy and substantial, the whole weighing 12,000 and 15,000 lbs. With them are sets of wrought iron wrenches, over head pulleys and hangers.

The tight and loose pulleys are 21 inches diameter and 5 inch face, and should make 130 revolutions per minute. Weight 12,000 and 15,000 lbs.



SEVEN AND EIGHT FEET IRON PLANERS.

24 x 24 and 30 x 30 inches.

Weight, 4,500 and 5,500 Lbs.

Seven and Eight Feet Iron Planers.

24 x 24 and 30 x 30 inches.

These planers have heavy cut gear with extra wide face. The cross-slide is square on top with the tool-rest gibbed on top and back.

All the screws, bolts and nuts on the cross-slide and tool-rest are steel. All the shafts are of large diameter.

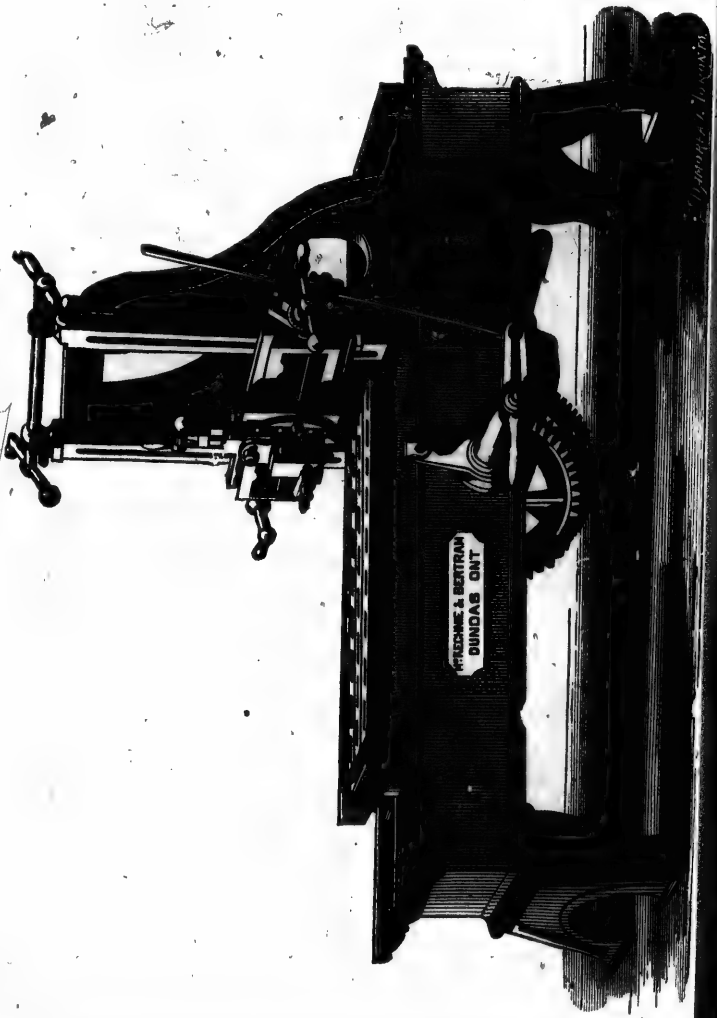
These planers have quick return motion on table, and automatic belt shifters.

The ways, slides and bearing surfaces are scraped to true bearings. The reversing motion is positive, noiseless, and without jar.

The bed is heavy and has hollow or box ribs, a feature in all our planers securing rigidity to the machine. With them are the usual wrought iron wrenches, countershaft and hangers.

Automatic feeds in all directions are attached when so ordered.

The tight and loose pulleys are 15 inches diameter and four inch face, and should make 100 revolutions per minute. These machines weigh 4,500 and 5,500 lbs.



NINE AND TEN FEET IRON PLANERS.

30 x 30 and 36 x 36 inches.

Weight, 6,600 and 8,000 Lbs.

Radius Link Planer Attachment.

This attachment is made for our nine foot 30 x 30 inch iron planer, is used for planing curves of any radius, and perfectly parallel curves as applied to the ordinary planer. It is quickly attached, easy of operation, and does accurate work.

Planer Vises—Planer Centers.

We can supply for any of our planers a very handy and convenient vise; we also manufacture and can attach, if so ordered, on any of our machines, a pair of planer centers.

Nine and Ten Feet Iron Planers.

30 x 30 and 36 x 36 inches.

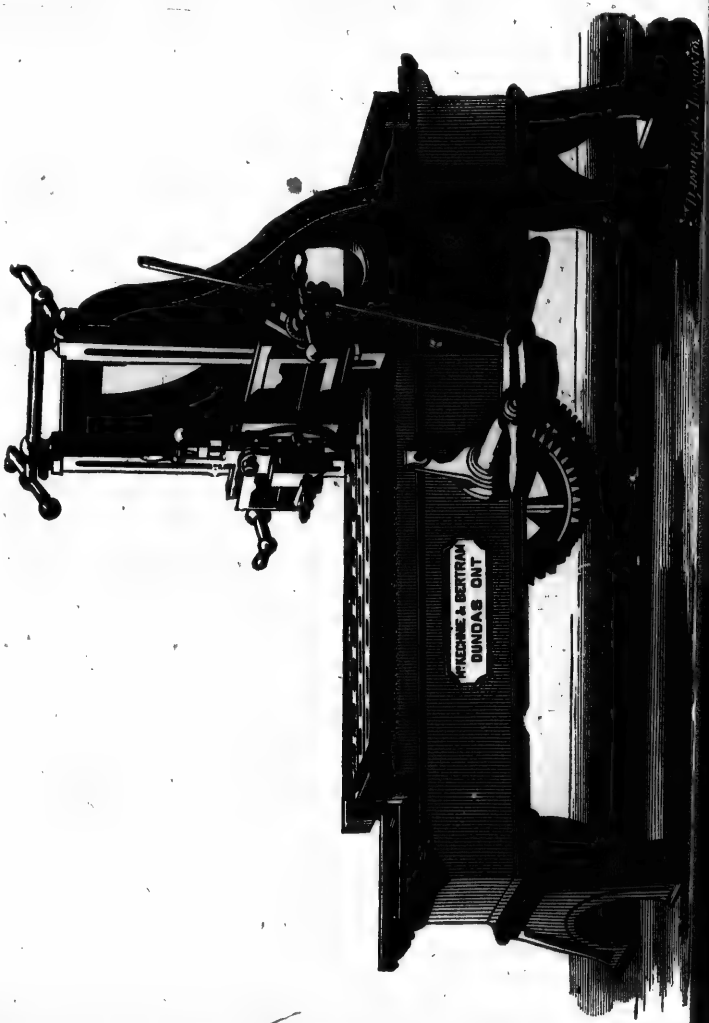
These planers have heavy cut gear with extra wide face. The cross-slide is square on top with the tool-rest gibbed on top and back. All the screws, bolts and nuts on the cross-slide and tool-rest are steel. All the shafts are of large diameter.

These planers have quick return motion on table, and automatic belt-shifters.

The ways, slides and bearing surfaces are scraped to true bearings. The reversing motion is positive, noiseless, and without jar. The bed is heavy and has hollow or box ribs, a feature in all our planers securing rigidity to the machine. With them are the usual wrought iron wrenches, countershaft and hangers.

Automatic feeds in all directions are attached when so ordered.

The tight and loose pulleys are 18 x 4½ inches, and should make 100 revolutions per minute. Weight 6,600 and 8,000 lbs.



FIVE AND SIX FEET IRON PLANERS.

Weight, 2,700 and 3,200 Lbs.

PLANERS.

00 Lbs.

Five and Six Feet Iron Planers.

20 x 20 and 24 x 24 inches.

This cut represents our 5 and 6 feet iron planers. They have the same style of pattern and mode of action, with strong and accurately cut gear, and rack wheel of large diameter.

Machines have quick return motion on table, and automatic belt-hifters.

The cross-slide is solid and heavy, with all the screws, bolts and nuts of steel.

All the ways and slides are scraped to true bearings, reversing motion is positive, noiseless, and without jar.

All these planers are tested, and the tables planed smooth and ready for work before leaving the shop.

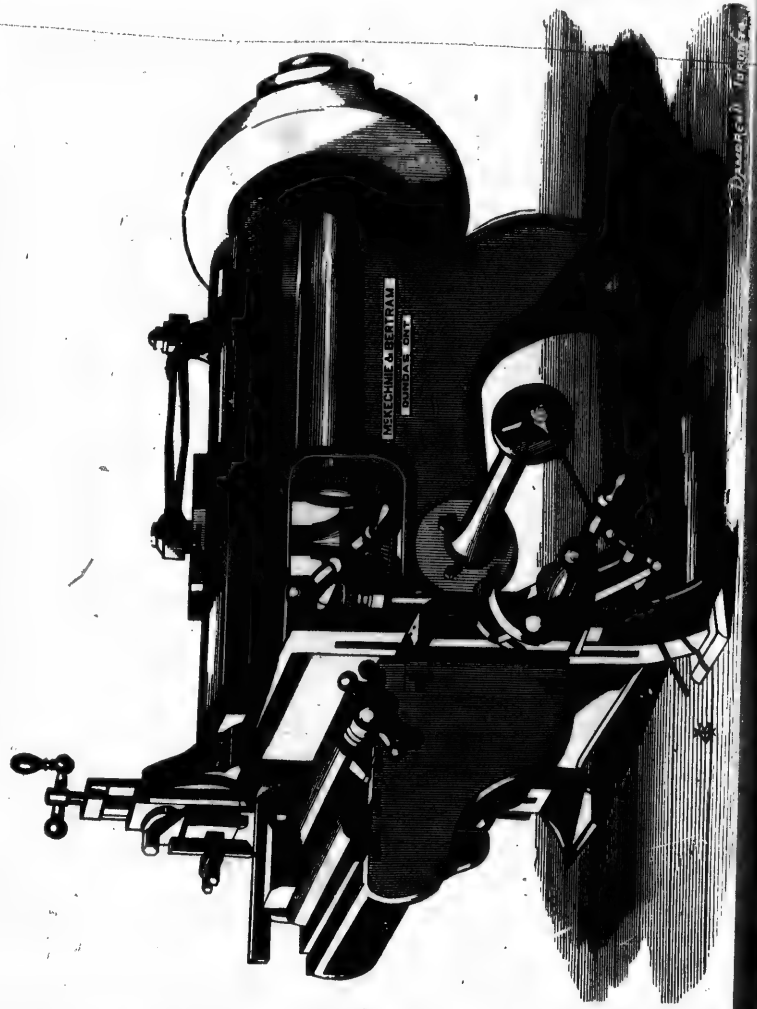
Automatic feeds in all directions are attached when so ordered.

Wrought iron wrenches, countershaft and hangers furnished.

Tight and loose pulleys on 5 feet planer, 11 inches diameter and 4 inch face, and should make 85 revolutions per minute.

Tight and loose pulleys on 6 feet planer, 10 inches diameter and 4 inch face, 85 revolutions per minute.

Weight of 5 feet planer 2,700 lbs. Weight of 6 feet planer 3,200 lbs.



IRON SHAPING MACHINE.

10 x 18 inches.

Weight, 2,900 Lbs.

Iron Shaping Machines.

Iron Shaper, 10 x 18 inches.

The cut represents our iron shaper, capable of planing a surface of 10 in. by 18 in. This machine is admirably adapted for doing the small and intricate work, usually done in the vise. Machine has Whitworth's quick return motion, automatic and independent circular and cross feeds, and has on tool block a quadrant, by which concave surfaces can be rapidly planed out to the smallest diameter. This machine is of heavy and substantial construction and is a very complete tool in itself, being provided with a suitable vise, countershaft, hangers and wrenches, etc., all complete. Fast and loose pulleys on countershaft 15 in. x 8½ inches, and should make 130 revolutions per minute. Weight 2,900 lbs.

Improved 24-inch Shaper.

We have in this machine an addition to our high-class tools which combines all the new and improved mechanical motions necessary to make this machine superior to anything in this line yet produced. Machine has a stroke of 24 inches, cross feed of 26 inches, and will plane a piece 15 inches high; it is operated by a worm and worm wheel, has quick return motion, is double belted, has automatic belt-shifters, stroke of ram can be altered while machine is in motion, and when so ordered has automatic and independent down, cross, angular, and circular feeds Machine is of a hollow box construction, will cut a key-way in a 3½ inch shaft of unlimited length, and is provided with a vise, countershaft and wrenches, etc., all complete. Fast and loose pulleys on countershaft 14 in. x 14 in., and should make 250 revolutions per minute. Weight, 3,300 lbs. Photograph of machine to be had on application.

Shaper, 12 x 42 inches, with 2 Tables.

This machine is of the latest and best approved style, has a stroke of 12 inches, traverse of 42 inches, and is provided with automatic cross and circular feeds, and vise, countershaft and wrenches, etc., all complete. Countershaft has 2 sets of fast and loose pulleys, 12 x 4, and should make 380 revolutions per minute, and 18 x 4, and should make 135 revolutions per minute. Weight 3,400 lbs. Photo. on application.

Shaper, 16 x 66 inches, with 2 Tables.

Same as the above machine with all latest improvements; but having a stroke of 16 inches and traverse of 66 inches, furnished all complete with fast and loose pulleys same as above. Weight, 5,500 lbs.. Photograph on application.

No. 1 Radial Drill, to Bore in a Radius of Five Feet,

WITH SELF-ACTING FEED.

From the accompanying cut it will be seen that this drill is specially suited for locomotive and engine shops. The motion can be changed from double to single gear instantaneously. The radial arm swings on a heavy column and has a deep bearing on the same with binder. It bores holes in a radius of 5 feet.

The drill spindle is driven by a large spur gear of wide face, giving it great power when working without the back gear. The important bearings are bushed with bronze. The spindle and top screw are steel with bronze nut. All the wearing parts here subjected to pressure are bronze and cupped for oil.

This and all our drilling machines are socketed for Morse taper. The bed is an oblong box slotted on 3 sides with door and shelves for tools. This machine is extra heavy, weighing 8,000 lbs. Countershaft, hangers and wrenches are provided. Fast and loose pulleys 18 inches by 5 inches; should make 150 revolutions per minute.

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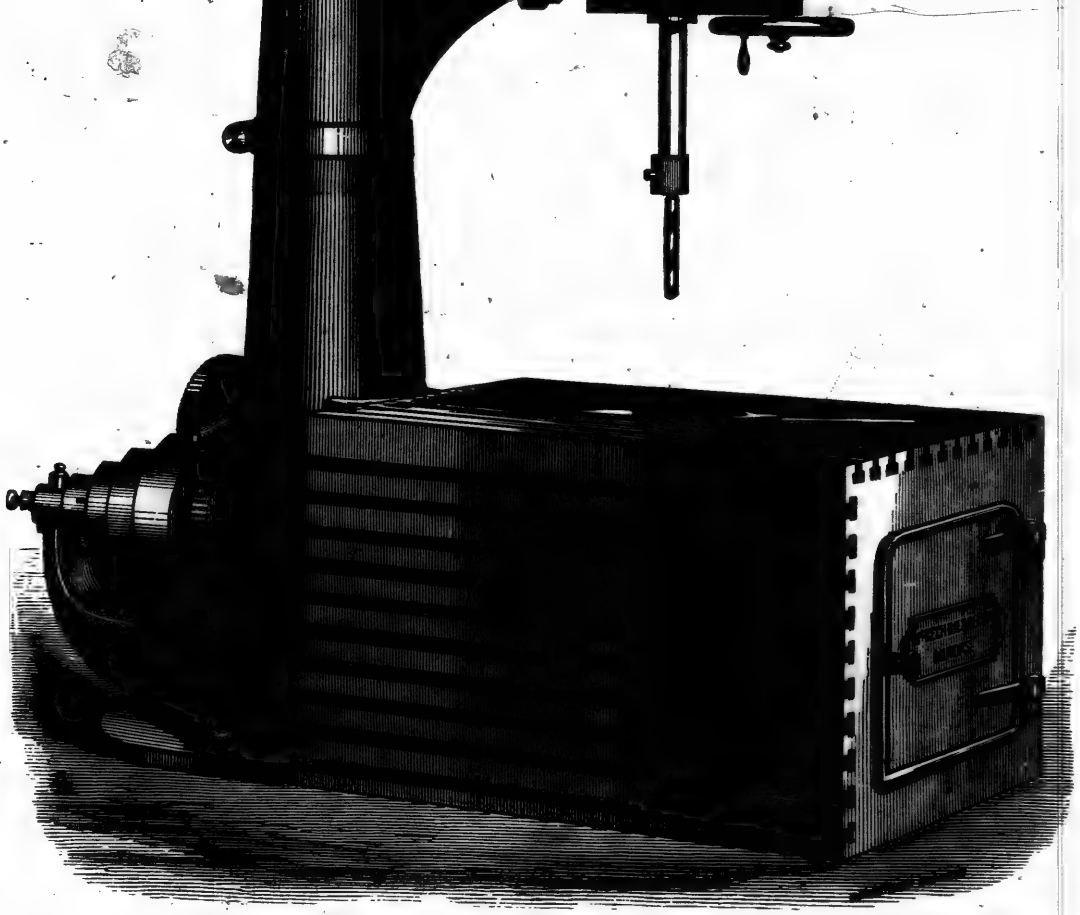
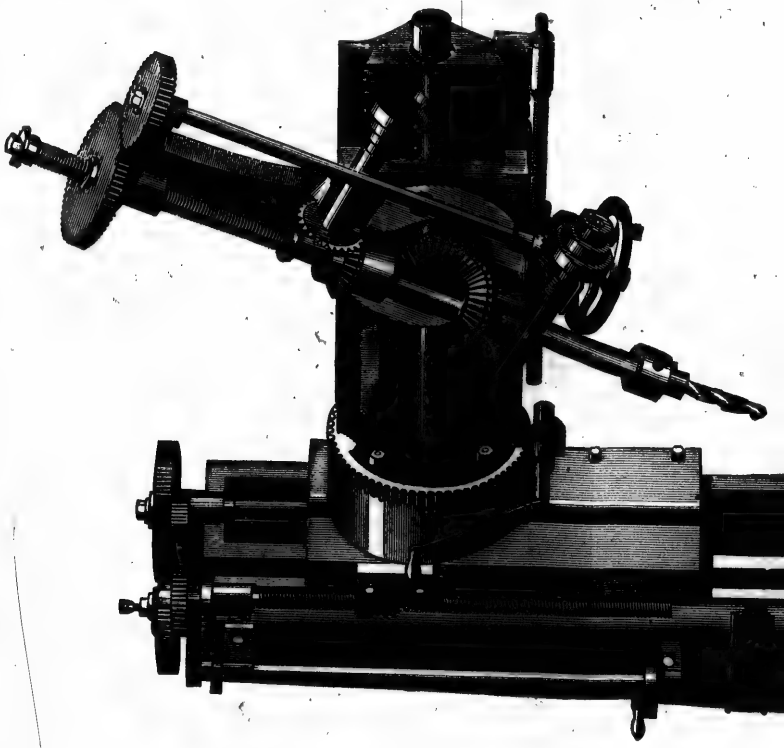
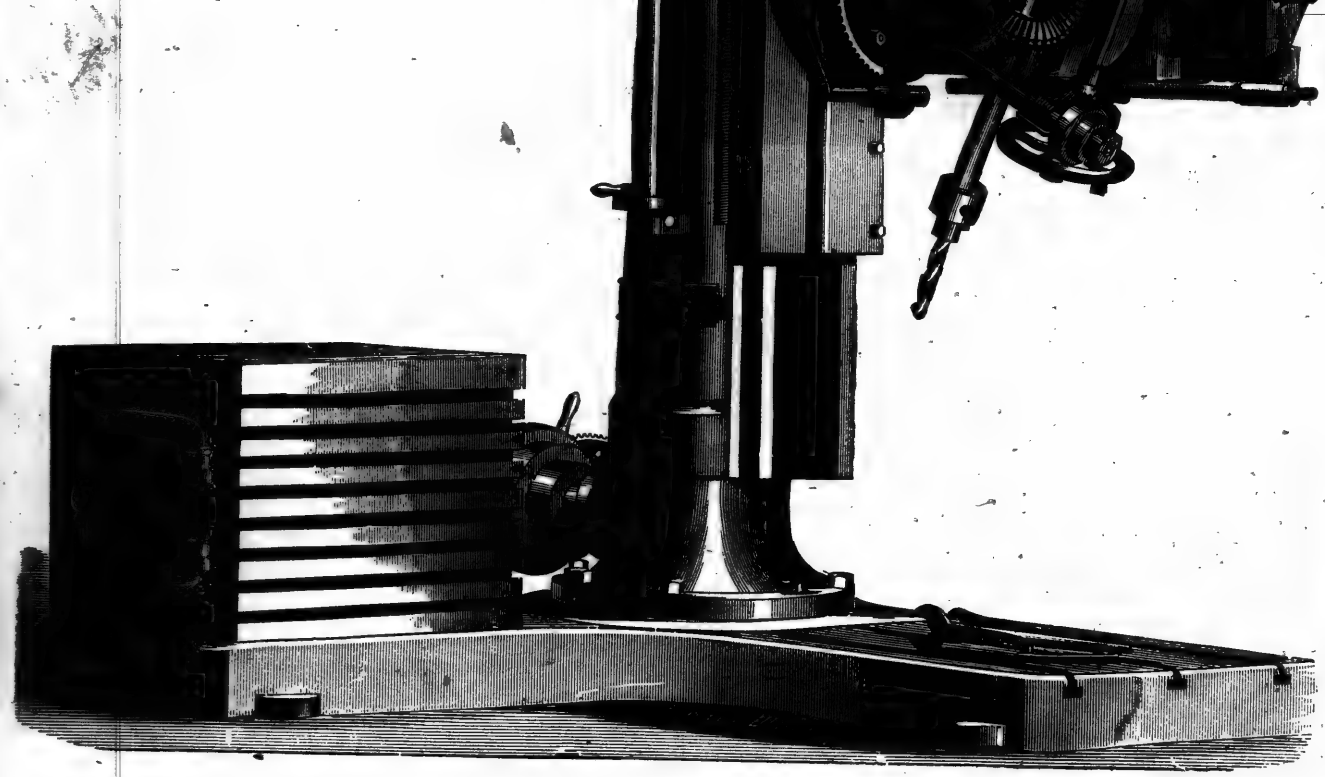


No. 1 RADIAL DRILL, DOUBLE GEARED AND SELF-ACTING FEED.





No. 1½ RADIAL DRILL.

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No. 1½ Radial Drill, to Bore in a Radius of Five Feet.

This drill, lately designed and perfected by this firm, has advantages over any other machine of its class manufactured.

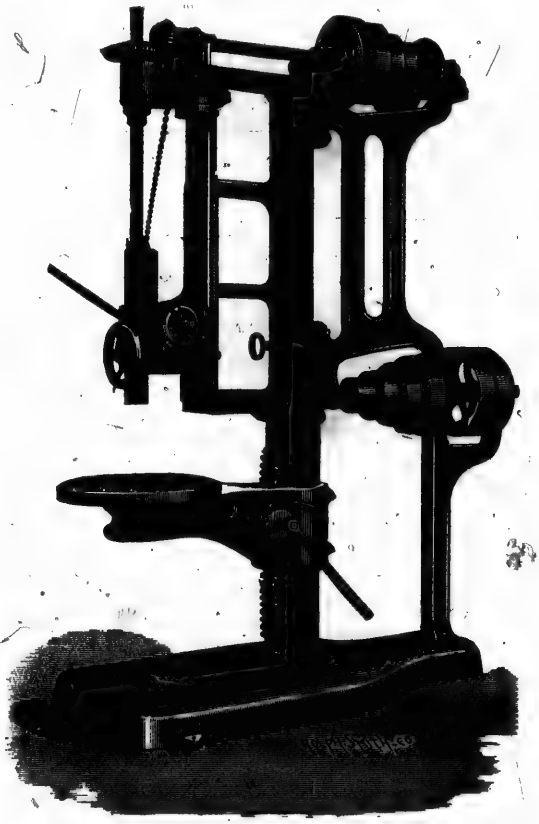
The bed is L shaped, having the two wings slotted for the reception of heavy work. On one of these is placed a movable box slotted on three sides similar to that on No. 1 drill. On the centre column is a sleeve extending its whole depth, having an upright slide on front, and on this side is a movable block carrying the radial arm. An upright screw operated by reversing gear raises and lowers the movable block and arm to any required point. The radial arm is fitted into a socket in the movable block and can be turned completely round to any angle by heavy worm gear. Independently of this the drill stock can be turned to any angle on the radial arm.

A graduated scale on these separate movements enables the operator to drill any conceivable angle, or change instantly to the square.

The machine is back-geared and self-acting. The drill spindle and top-screw are steel, with the wearing parts subjected to pressure of bronze.

It bores in a radius of five feet, and has the advantage of operating on heavy work on the bed-plate, when the arm can be changed momentarily to the slotted box for light work as required. The box has dock and shelves for tools.

The various movements on this machine render it the handiest made for all classes of work. Weight, 9,230 lbs. Countershaft and hangers furnished. Fast and loose pulleys 18 inches by 5 inches and should make 150 revolutions per minute.



No. 2 IRON DRILLING MACHINE.

Bores to centre of 4 feet.

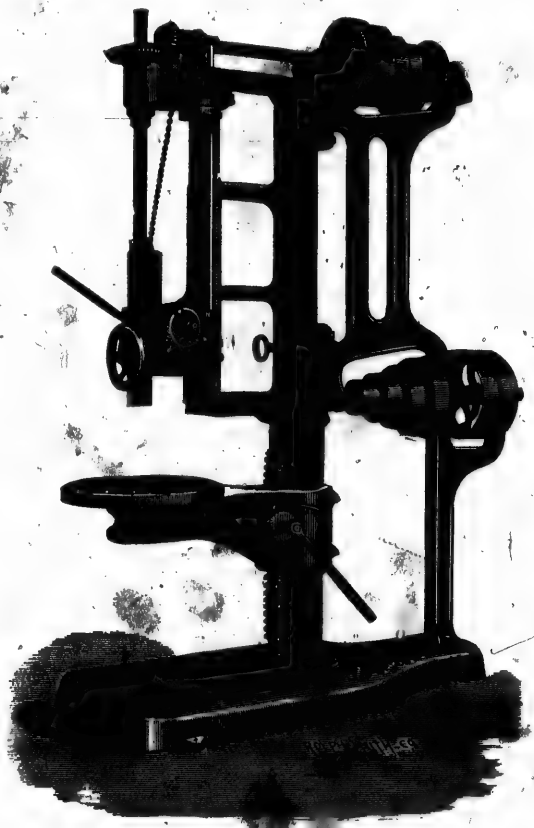
Weight, 3,040 Lbs.

No. 2 Iron Drilling Machine.

Bores to centre of 4 feet.

This new and improved tool combines many excellent qualities which specially adapt it to the requirements of either large or small shops. It consists of a heavy column and foundation plate; this extends out on the back to carry the frame containing the countershaft, cones and gear; this frame being attached to the column gives it great rigidity in boring work on the foundation plate. The bevel gears on top are cut. The headstock carrying the drill-bar can be raised and lowered to suit any work. The drill-bar is 2½ in. steel, is fed by wrought-iron rack, steel pinion and friction worm gear, which can be changed at pleasure to lever on hand feed. The bar can be thrown up quickly by the lever and is counterbalanced by chain and weight. The table swings on a heavy arm which can be raised and lowered by a rack and pinion; it can be thrown to one side or brought to any position and fastened with binding screws. The cones are large diameter and wide face.

The fast and loose pulleys are 15 x 4 in. and should be run at 150 revolutions per minute. Weight, 3,040 lbs.



No. 3 IRON DRILLING MACHINE.

Bores to centre of 3 feet.

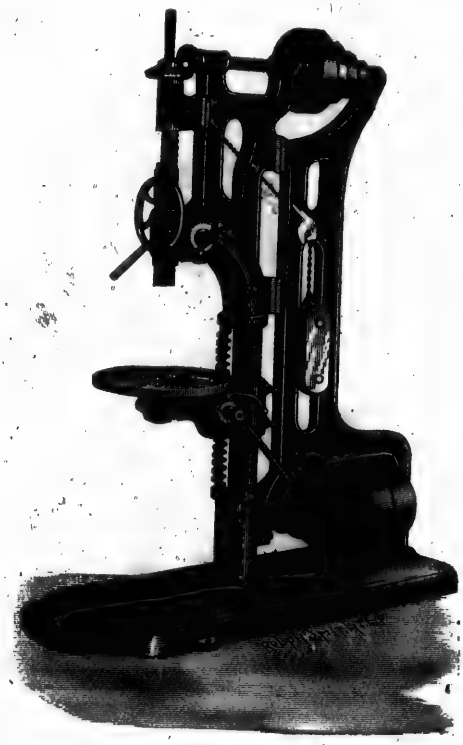
Weight, 2,130 Lbs.

No. 3 Iron Drilling Machine.

Bores to centre of 3 feet.

This new and improved tool combines a great many excellent qualities which specially adapt it to the requirements of either large or small shops. It consists of a heavy column and foundation plate; this extends out on the back to carry the frame containing the countershaft, cones and gear; this frame, being attached to the column, gives it great rigidity in boring work on the foundation plate. The bevel gears on top are cut. The head-stock carrying the drill-bar can be raised and lowered to suit any work. The drill-bar of 2¼ inch steel is fed by wrought-iron rack, steel pinion and friction worm gear, which can be changed at pleasure to lever or hand feed. The bar can be thrown up quickly by the lever, and is counterbalanced by chain and weight. The table swings on a heavy arm, which can be raised or lowered by a rack and pinion. It can be thrown to one side, or brought to any position and fastened with binding screws. The cones are large diameter and wide face.

The fast and loose pulleys are 15 x 4 in. and should run at 150 revolutions per minute. Weight, 2,130 lbs.



IMPROVED No. 4 DRILLING MACHINE.

Weight, 1,400 Lbs.

Improved No. 4 Drilling Machine.

This cut represents our new No. 4 drill. This machine, when so ordered, is arranged with back gear and automatic power feed. It is furnished with 1½ inch steel spindle, and the feed is operated by a wrought cut rack fed with a hand, wheel and worm which can be detached at will and the spindle run quickly up and down, with a counterbalanced lever. The bevel gears on top are cut. Cones have wide face. The foundation plate extends in front and is slotted for work. The drill bores to the centre of 22 inches and is a substantial and rigid machine. Weight, 1,400 lbs.

Pulleys on countershaft 12 inches diameter and 4 inch face; 150 revolutions per minute.

Improved Lever Drilling Machine.

This drill is specially adapted to agricultural implement shops, but can be used to great advantage in many other factories. It consists of a cast frame planed in front for the table, which is gibbed on.

The drill spindle is stationary, and the table is raised and lowered by a lever which has a lock attachment by which it can be run up or down to any position. It can bore holes up to ¾ inch diameter, has countershaft and hangers with 4-speed cone. Photograph can be had on application.

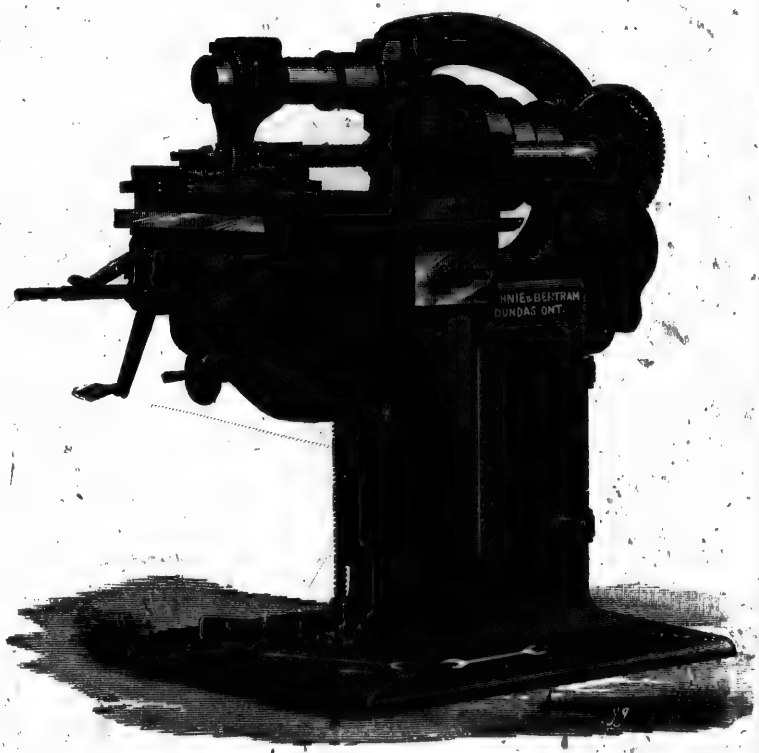
Fast and loose pulleys 10 x 2½ inches, and should run at 150 revolutions per minute. Weight, 550 lbs.

Suspension Drill.

This drill is a powerful tool compared with its low price.

The spindle is 2¼ diameter and is pressed down with 2 screws connected with cut gear. It has a stroke of 18 inches. Without the back gear it will bore from 2 inches down. With back gear attached it is largely used by boiler makers for head sheet drilling, and has ample power for anything that way. Photo can be had on application.

Tight and loose pulleys 11 inches diameter and 3 inch face. Revolutions, 150 per minute. Weight, 600 lbs.



Nos. 1 AND 2 UNIVERSAL MILLING MACHINES.

No. 1 Universal Milling Machine.

This machine is of a substantial and heavy construction and is almost an indispensable tool in the machine shop. The table has a longitudinal travel of 36 inches, and can be brought out from the face of the machine 9 inches, has automatic stop feed, and the slots in all directions milled out. The spindle is of cast-steel, extra heavy, runs in bronze bearings, has compensating adjustment in case of wear, and is bored throughout its entire length for driving out the arbors. The nut or main slide is capable of adjustment for wear; the elevating screw is furnished with index plate. Cones have wide face, and machine throughout is of the best workmanship, material, and finish. Machine is furnished with a suitable vise, countershaft and wrenches all complete. Fast and loose pulleys on countershaft 12 x 4 inches and should make 150 revolutions per minute. Weight, 3,500 lbs.

No. 2 Universal Milling Machine.

This machine is an excellent counterpart of our No. 1 machine, being somewhat of a lighter construction. The table has a longitudinal travel of 24 inches and can be brought out from face of machine about 7 inches. Machine is furnished with a suitable vise, countershaft and wrenches all complete. Fast and loose pulleys on countershaft 10 x 4 inches and should make 150 rev. per minute. Weight, 2,000 lbs.

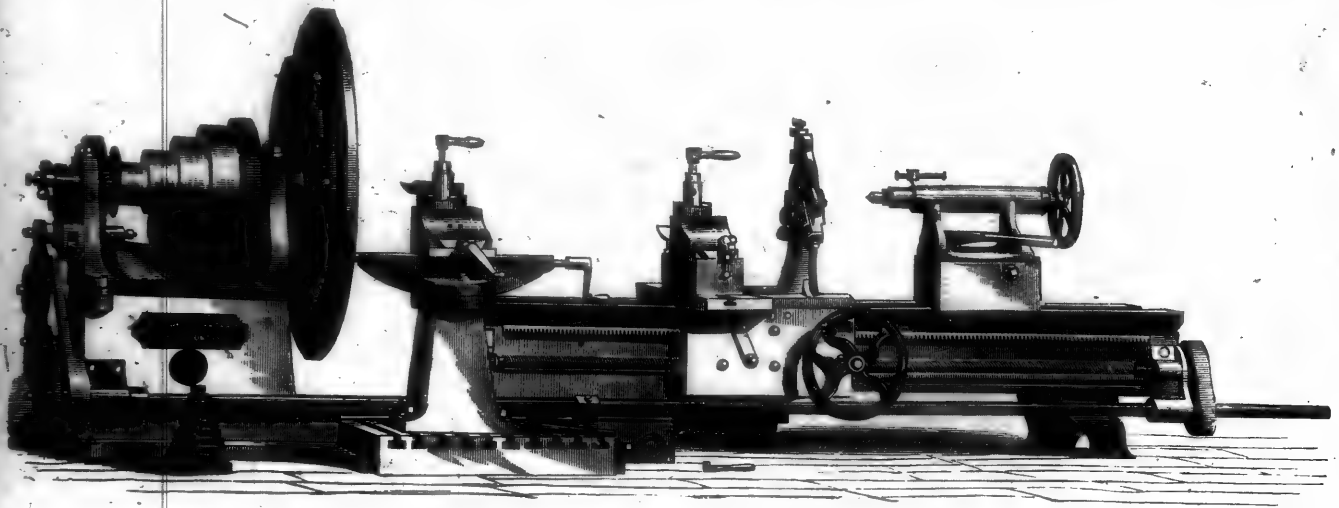
ATTACHMENTS.—We can attach to the Nos. 1 and 2 universal machines, if so ordered, any of the following: Spiral cutting attachment, dividing head-stock with index plates for cutting gear, etc., and [illegible] centers. Photographs of these can be had on application.

No. 1 Plain Milling Machine.

This machine is an exceptionally strong, heavy, and substantial tool, and is particularly adapted for all kinds of heavy locomotive work, etc. Fast and loose pulleys on countershaft are 18 x 6 inches, and should make 150 revolutions per minute. Weight, 3,500 lbs. Photograph on application.

No. 2 Plain Milling Machine.

This machine has been designed to meet the wants of all who require a serviceable and handy tool for doing quick, true and light milling. It has automatic feed, with stop motion adjustable at any point, is provided with a foot-stock for steadying the ends of arbors in heavy cuts, and is fitted with a suitable vise. Machine is of first-class workmanship, material and finish, and is furnished all complete with countershaft and wrenches. Fast and loose pulleys on countershaft are 12 x 3 in., and should make 175 revolutions per minute. Weight, 1,300 lbs. Photograph on application.



Nos. 1 AND 2 BRAKE LATHES.

Weight, No. 1, 16,500 Lbs.; No 2, 14,300 Lbs.

(See Pages 74 and 75.)

Self = Acting Lathes.

No machine tool occupies such an important position in the workshop as the lathe. Being the first invented, and the most useful, considerable attention has been paid to its improvement.

The various illustrations of lathes in this catalogue by no means do justice to the style of machines we now build, as those now made by our firm have been altered and improved from time to time to keep up with the requirements of the modern machine shop. Increased width of cones, more powerful gear and heavier spindles, with the headstocks and other parts strengthened and all parts subject to wear case-hardened, make them in many respects superior to any in the market.

We would particularly draw attention to an important change in the size of the running spindle. While we claim large increase in the size of the front bearing, those parts hid by the cone and gear are not reduced out of all proportion, and this, with the front boxes of hard bronze, renders these lathes serviceable in their altered condition while either running on fast or slow speeds.

Regarding the beds of our lathes, we have invariably adhered to the flat top as the most durable and best adapted to all classes of work, such as turning, boring on the chuck and boring on the rest, which latter, as our rests or saddles are perfectly gibbed down and have an extra long bearing on the beds, renders them capable of doing work impossible on any other lathe.

We would also draw attention to the form of our lathe and planer beds. The universal practice consists of plain single cross-girts, but we have long adopted the system of double or hollow girts closed at the top. This, though more expensive than any other form, we consider indispensable in all machine tools, and though firmly convinced of the correctness of our practice regarding the style of our lathes, we will always be prepared to meet the views of those who have been used to the V form; but in this we will be always guided by the principles laid down above, viz., large bearing surface to prevent for some time the inevitable wearing down of the V where most used, thereby rendering the gib in time of little use.

Weight, No. 1, 16,500 Lbs.; No 2, 14,300 Lbs.

(See Pages 74 and 75.)

No. 1 Brake Lathe.

This lathe is an extra heavy and massive tool.

The foundation plate is cast in one piece, and extends below and supports the main head, the sliding bed, and the pedestal and rest for turning pulleys. The main head is treble geared, the last motion being an internal gear on the back of face plate. This can be changed rapidly from treble to single gear when required.

The spindle is 5½ inches diameter and steel. The sliding bed is moved to and from the face plate by a rack to suit any width of pulley. On the saddle of this is a compound slide rest. The foundation plate is extended out in front of the brake, and is slotted for a heavy pedestal, the height of which coincides with that of the carriage, so that the compound rest can be shifted from one to the other as required.

The motion is transmitted to the leading screw by a heavy shaft, extending from the main head to the end of the bed where the shaft and screw are connected by heavy spur gear.

The brake can be extended to turn a pulley 7 feet diameter and 36 inches wide. The lathe swings 42 over the bed.

Countershaft, steady and follow rests, and a full set of screw cutting gear and wrenches are furnished.

Tight and loose pulleys on countershaft 24 inches diameter and 5½ inches face. Revolutions per minute, 70. Weight of lathe, 16,500 lbs.

No. 2 Brake Lathe.

This lathe is similar in style and pattern to that on preceding page, and all the parts correspond to description but are of reduced size.

The spindle is cast steel, 4½ inches diameter. The head is treble geared, with all the shifting appliances of No. 1 Lathe. The foundation plate is the same, carrying the sliding bed, main head and pedestal, with compound slide rest.

The leading screw is geared from the head as in No. 1 Lathe. The bed is shifted to and from the face plate by a rack and lever. The brake swings 6 feet in diameter and admits 36 inches in width. The swing over bed is 36 inches. This lathe has the advantage for general machine shops of boring and turning pulleys at one and the same time. Weight, 14,300 lbs.

No. 3 Brake Lathe.

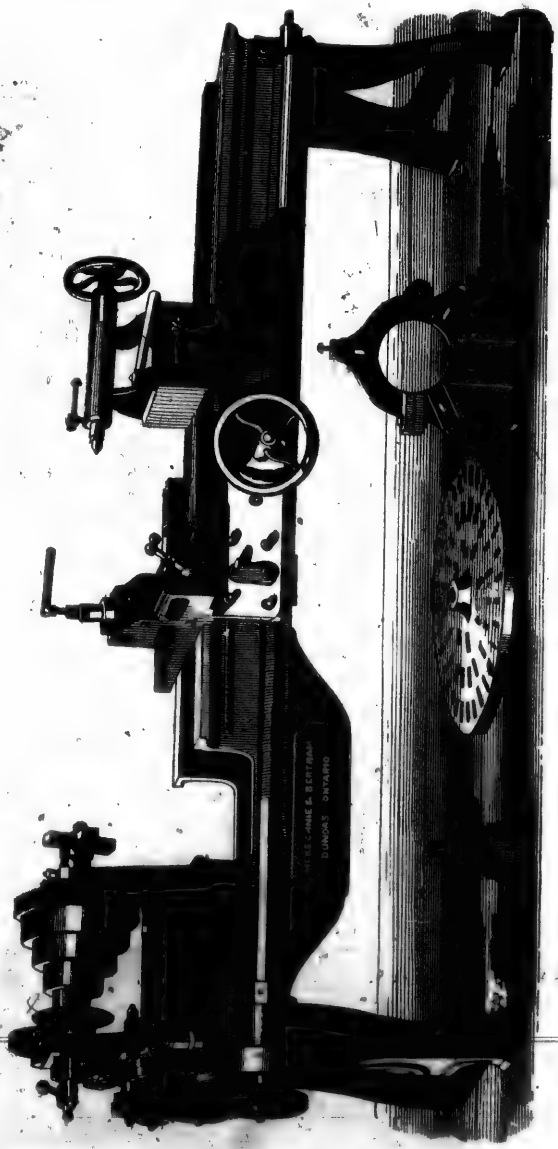
This lathe swings 5 feet 2 inches in brake and over bed as the above, but without the pedestal and rest in front. The foundation plate extends below and carries the main head and sliding bed, which is shifted in the same manner as above.

The head has the ordinary single or back gear. The gear is of large diameter and wide face, giving this lathe strong turning capacity.

The cones are extra wide face. The spindle is of cast steel.

The slide rest can be removed, leaving the carriage plain on top for boring cylinders. On all the above lathes, countershaft, steady and follow rests, change gear and wrenches are furnished.

Tight and loose pulleys on countershaft of the above lathes, 18 inches diameter, 5 inch face, 100 revolutions per minute. Weight, 9,050 lbs.



FORTY-INCH GAP LATHE.

Weight, 4,200 Lbs.

Forty Inch Gap Lathe.

This cut represents our smallest gap lathe. It swings 40 in. x 12 in. in gap and 24 inches over the bed. The main head has cast steel spindle. The back gear is large and of wide face, giving this lathe strong turning power.

The top arbor has long bearings, which is cast solid in the head, forming a strong centre for the reversing gear. The screw cutting gear can be used single or compound.

The bed has hollow or box ribs, and the piece below the gap is double, making this part of the bed strong and rigid, and a piece is fitted into the gap, rendering this the same as an ordinary lathe, which can be removed when required. The tool rest can be removed from the carriage, leaving a flat surface for boring. The latter has a long bearing on the bed and is securely gibbed.

With this lathe there is a large face plate for the gap, a medium size for small work, and cross, steady and follow rests, countershaft, and 15 changes of screw gear, Pulleys on the countershaft 11 inches diameter and 4 inch belts, with 150 revolutions per minute. Weight of lathe, with 12 foot bed, 4,200 lbs.

Forty-eight Inch Gap Lathe.

This lathe is the same style as that described on the preceding page, but of heavier pattern. It swings in the gap 48 x 14 inches, and over the bed 28 inches. This is a suitable tool for the machine and engine shop, being adapted for turning and boring pulleys, cylinders, &c.

A piece is fitted into the gap, rendering this the same as an ordinary lathe, which can be removed when required.

The spindle is cast steel, 3 inches diameter.

The reversing gear and attachment for shifting same, sure and durable. The carriage is flat on top, when the tool rest is removed. It has long bearing on the slide, and being gibbed makes it immaterial which way the cutters revolve in cylinder boring.

With this lathe is a large face plate for the gap, and medium size for small work, steady and follow rests, countershaft, wrenches, and 15 changes of screw cutting gear. Pulleys on counter 15 inches diameter and 4 inch face; revolutions per minute, 100. Weight, 5,500 lbs.

Lathes with Conical Bronze Bearings.

A necessity has arisen, from the rapid increase of the railway system of Canada, for a class of tools specially adapted to the machine and locomotive shop.

With a view to this end we have lately added to our list of manufactures a style of lathe equal in weight and solidity to the English, but having smooth, accurately cut gear, and all the movements of the rest and feed of a handier style.

A description of the No. 2 pattern will answer for the rest. The gear on head is 3 inches and 2½ face. Cone for 4½ inch belt, smallest speed, 8 inches diameter. Bearings conical and of bronze.

The back journal on spindle is movable, with lock nuts for adjustment, with a back centre and bridge to secure the whole from end play. Reversing gear and attachment for shifting same secure and strong. The leading screw is 2 threads to the inch.

The rod feed is independent of screw. All the changes from rod feed to screw cutting, or from either to cross feed, can be effected momentarily by the operator from the front of the rest.

All the small gear and all parts subject to wear are made of steel. The bed is cast with hollow or box ribs, and all these lathes are made with or without compound slide rests as required.

Countershaft Pulleys	No. 1,	24 in. diameter,	5 in. face,	100 revolutions.
" "	No. 2,	18 "	4½ "	120 "
" "	No. 3,	12 "	4 "	150 "
" "	No. 4,	10 "	3½ "	150 "

Weight, No. 1, 8,500.
Weight, No. 2, 5,800.
Weight, No. 3, 3,000.
Weight, No. 4, 2,000.

No. 1 Lathe.

This lathe is an extra heavy machine. The back gear is of large diameter, 21 inches by 2¾ face and ¾ pitch.

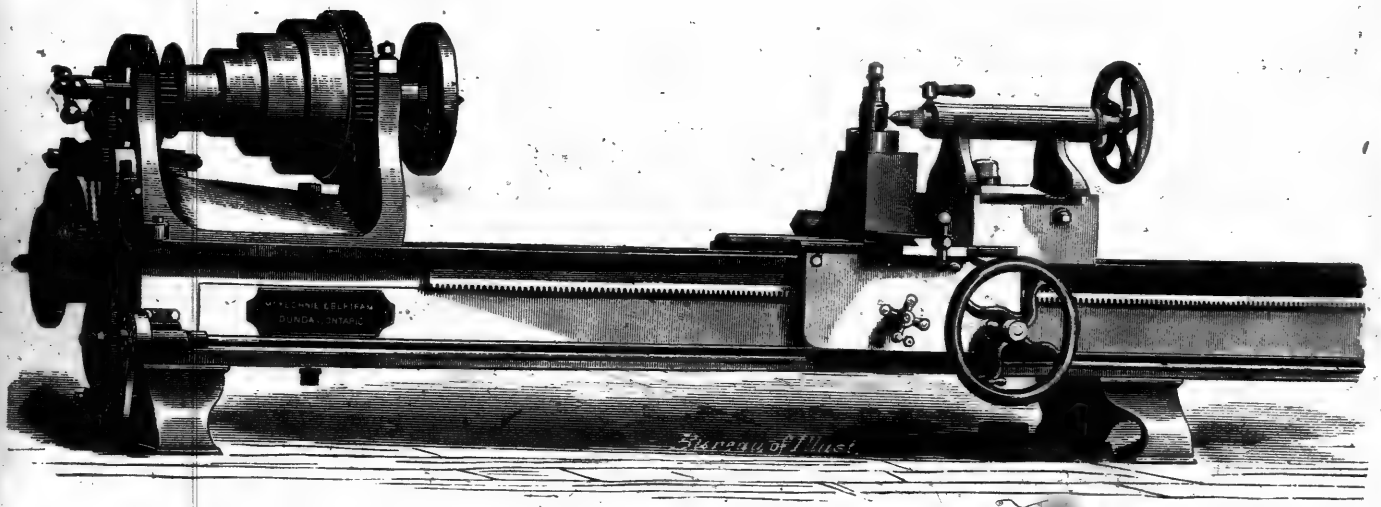
The cones are of large diameter and wide face, enabling this lathe to turn with great power what it can swing.

The spindle [illegible] steel, 4½ inches diameter, with long bearings. It swings 30 or [illegible]es over the bed, as ordered. The carriage is the usual style, [illegible] for boring cylinders.

The tool rest can be made single or compound, or if required, can be made with 3-tool attachment for turning shafting. The carriage is securely gibbed to the bed. The bed, as in all our lathes, being flat on the top and presenting a large bearing surface, is not liable to wear down as if the carriage ran on narrow ribs; lathes using such having to be supplied with friction rollers to adapt the carriage to a surface rapidly getting out of truth.

The rod feed is entirely independent of the screw, and all the changes from one to the other are effected from the front of the rest.

All the small pinions and worm gear in feed are wrought iron, or steel. Furnished with this lathe are countershaft, steady and follow rests. 15 changes of screw gear, and wrenches. Pulleys on countershaft 18 inches diameter and 5 inch belts; revolutions per minute 100. Weight of lathe 7,500 lbs.



No. 1 LATHE.

Weight, 7,500 Lbs.

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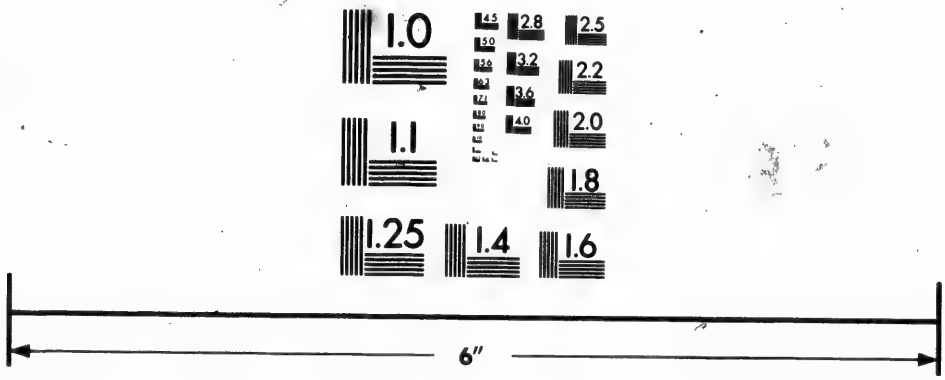
TEST TARGET (MT-3)



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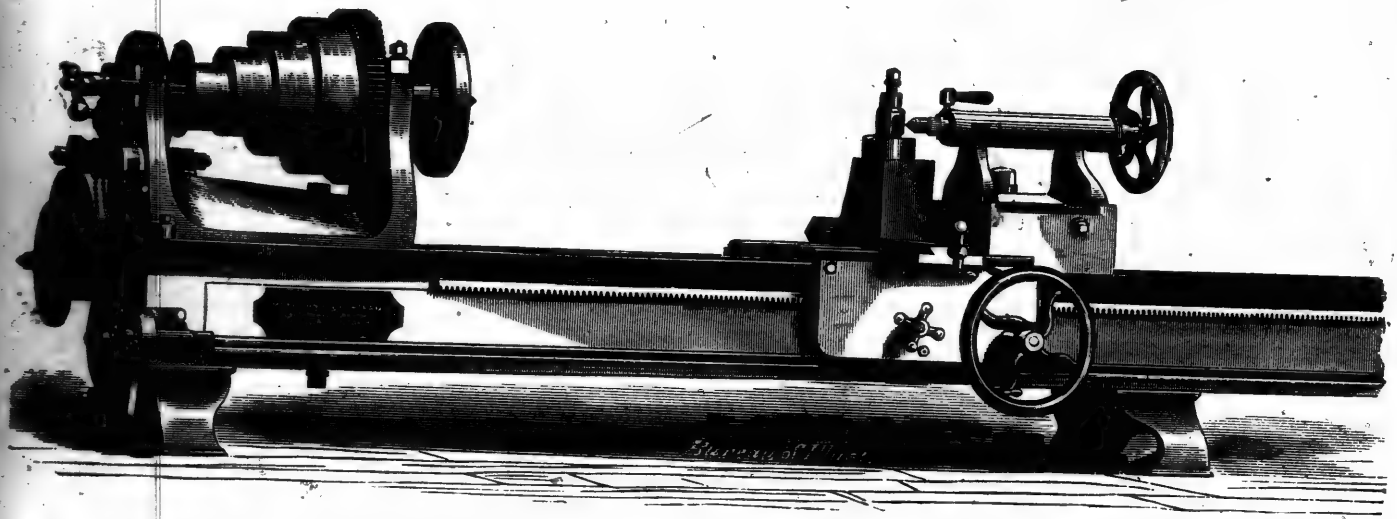

No. 2 LATHE.

Weight, 5,200 Lbs.

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No. 2 Lathe.

This lathe is the same style as our No. 1, but of reduced size. It swings 24 or 28 inches over the bed as ordered.

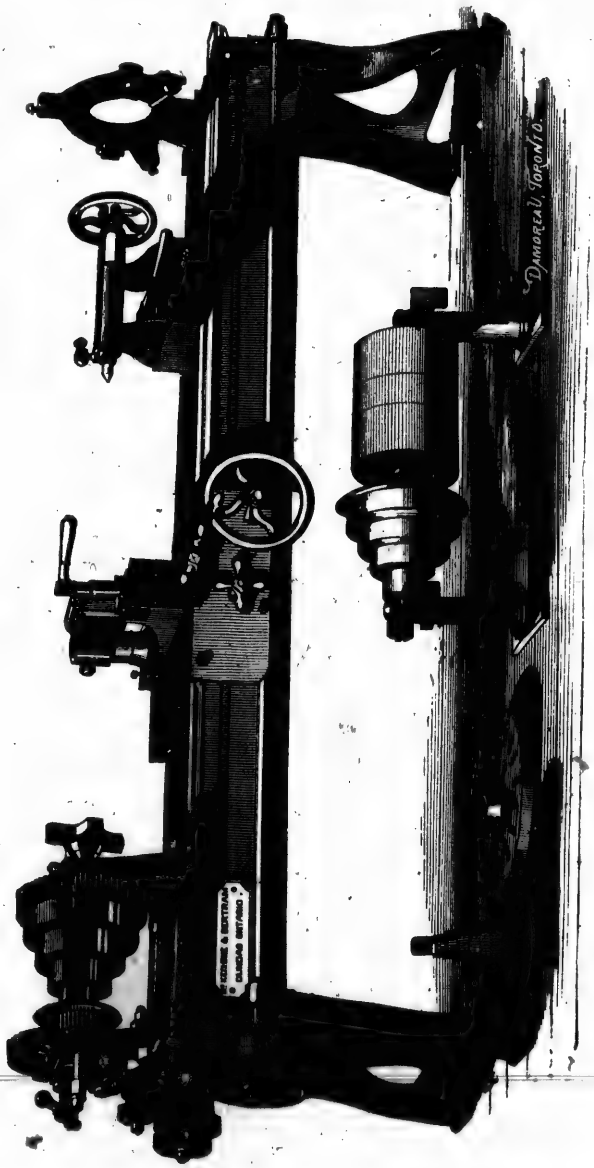
The spindle is cast steel, front bearings 3 inches diameter and 5 inches long. Cones for 4 inch belt. Back gear 18 inches diameter and 2½ inch face. The back gear brackets, as in all our lathes, are cast solid on the head and extra heavy, presenting a rigid fulcrum to the power while turning heavy pieces of large diameter.

The carriage is slotted for cylinder boring and has large bearing surface on the bed.

The rod feed and screw gear are entirely independent of each other.

When this lathe is required complete with screw, rod and cross feed, all the changes to either are effected momentarily from the front of the rest. This lathe can either be made with single or compound slide rest. For shafting, a double tool rest is provided and an extra slide in follow rest with a third tool if so ordered. Countershaft, steady and follow rests, and wrenches are provided. All small screws and parts subject to wear are steel.

Pulleys on countershaft 15 inches diameter and 14 inch belts, revolutions per minute 120. Weight 5,000 and 5,200 lbs. respectively.



No. 3 LATHE.
Weight, 4,000 Lbs.

No. 3 Lathe.

The accompanying cut represents our No. 3 lathe.

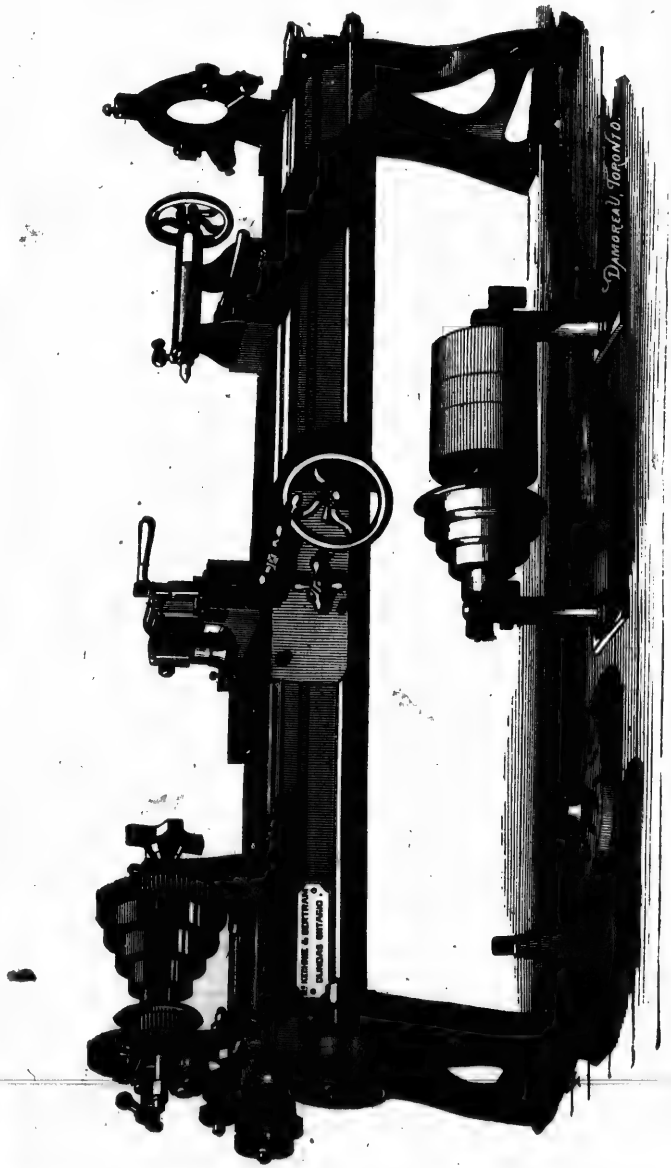
The back gear and cones are of new pattern, giving strong turning power. The spindle is cast steel 2½ inches diameter.

The main head, as in all the lathes manufactured by us, swings on a socket fitted in the bed, and can be set to an angle for boring tapers on the chuck, which can be taken advantage of in connection with the feed in producing taper holes of greater accuracy than by any other way.

The worm and wheel in the rod feed are steel and wrought iron, and the former runs in oil to prevent wear.

All the slides and bearings of these lathes are scraped to true surfaces. Small gear of wrought iron, countershaft, steady and follow rests, wrenches and 15 changes of screw gear and 3 changes for feed are furnished.

Countershaft pulleys 11 inches diameter and three inch belts; revolutions per minute 150. Weight of lathe with 10 feet bed complete 4,000 lbs.



No. 4 LATHE.

Weight, 2,000 Lbs.

No. 4 Lathe.

This lathe is largely used by agricultural implement and machine makers. It is the same style as our No. 3 lathe. It swings 16 or 20 inches over the bed as required by customers.

The spindle is of cast steel, $2\frac{1}{16}$ inches diameter. It has wide cones and gear for its size.

The carriage has long bearing on the bed, and is gibbed down; the lathe when so ordered can be made with an elevating tool rest which is operated by a screw on the back.

The rod feed is the same style as our No. 3 lathe, worm gear, steel and wrought iron.

The pinions working into the rack are cut of brass, and large diameter, producing an equal and true feed.

Countershaft, steady and follow rests, 25 changes of screw gear and 3 changes of feed gear.

Countershaft pulleys 10 inches diameter and 2½ belts; revolutions per minute 150. Weight 2000 lbs.

No. 5 Lathe.

This lathe, the smallest we manufacture, and which has been got up in the most approved style, has found a ready sale in all classes of machine shops for light work.

The spindle is of cast steel, $1\frac{13}{16}$ inches diameter, with bronze bearings.

The cone has 3 speeds, 2½ face, giving good belt power. It swings 13 inches.

The rod and screw feed with the gear is on the same principle as our No. 4 lathe. It has countershaft, steady and follow rests, with suitable wrought iron wrenches, and all work subject to wear case-hardened.

Fast and loose pulleys 10 in. by 2½ in., should make 180 revolutions per minute. Weight 1,200 lbs.

Cross Feed.

Cross feed is attached to all our lathes when so ordered.

Brass Finisher's Lathe.

This lathe is specially adapted for brass work of all descriptions; turning, boring, and chasing any piece with great rapidity. The tail-stock has a square cast-steel arbor, which can be used with a centre as an ordinary lathe; or by swinging the block to any angle it can bore tapers; and having a slide with cross-traverse can do facing off as well. The square arbor can be detached momentarily from the screw and thrown back quickly. It is furnished with a compound tool rest; hand rest for hand finishing; swinging rest for chasing and 6 hubs, with chasers, 8, 10, 11, 14, 16 and 18 threads per inch. The hubs are provided with a spring which allows the operator to cut thread close up to a shoulder with great precision. The lathe is strongly built, has steel spindle and gun metal bearings, and is all finished in first-class style. Countershaft has large cone, and has fast and loose pulleys, 12 x 3 inches, with 150 revolutions per minute. Weight 1,150 lbs. Photo on application.

Double Bolt Lathe.

This machine is of a new and improved construction and is specially adapted for turning bolts in locomotive and engine shops. The work operated on revolves on two fixed centres, thereby securing at all times true work. The feed screw is operated on by an eccentric motion, pawl and ratchets, and the rest can be moved by hand to any position. The revolving cone chucks have dogs for closing on the bolt heads. Two countershafts, shippers and set of wrenches are furnished. Fast and loose pulleys 12 in. x 4 in., and should make 100 revolutions per minute. Weight 2,225 lbs. Photo on application.

Fifty Inch Pulley and Gear Turning Machine,

WITH TWO TOOLS.

This machine has been designed specially for turning rapidly all diameters of pulleys and spur, or bevel, gear up to 50 inches. The frame is cast in one piece. The main spindle is driven with steel worm and gear cut 1¼ pitch, giving a uniform smooth motion. On front and back are two cross slides, which can be set square or tapering by graduated scales for crowning pulleys.

These are operated by powerful friction feeds, and the feed for both can be momentarily adjusted from ¼ inch down. On front of main spindle is an adjustable plate with drivers to bear evenly on the arms of pulleys. The smallest cone is 11 inches and the largest 24 inches, having 6 chages for 4¼ belt.

The cone shaft is bored for mandrels for polishing, a rest being provided for this purpose.

The machine cuts smoothly and with great power. Photo on application.

Fast and loose pulleys on countershaft are 24 inches diameter and 6 inches face, and should make 120 revolutions per minute. Weight 7,920 lbs.

Independent Four-Jaw Lathe Chucks.

These chucks are made with 4 independent jaws, as this style has from long practice proved the most efficient in the machine and engine shop.

As castings seldom come out perfectly true, great difficulty is experienced in working with the universal chuck, while the independent jaw can be adapted to any piece however eccentric in shape. Another advantage is that this chuck takes a very fine hold of a casting, and with a very small catch can turn pieces projecting considerably from the face plate, which would be impossible with any other chuck.

Our chucks have jaws made of Firths' cast steel (tempered). They can be made tight or slack on the chuck by the operator as required.

The screws are steel, and these with the jaws can be removed from the front by taking off the back nuts.

The chucks are heavy and solid to prevent spring. They can be made to fit any of our lathes, or left blank in the screw if so ordered. We make the following sizes:

For	No. 1,	Lathe	to	take	in 26	inches.
"	"	"	"		36.	"
"	No. 2,	"	"		22	"
"	"	"	"		23	"
"	No. 3,	"	"		16	"
"	"	"	"		20	"
"	No. 4,	"	"		10	"
"	"	"	"		13	"
"	No. 5,	"	"		8	"

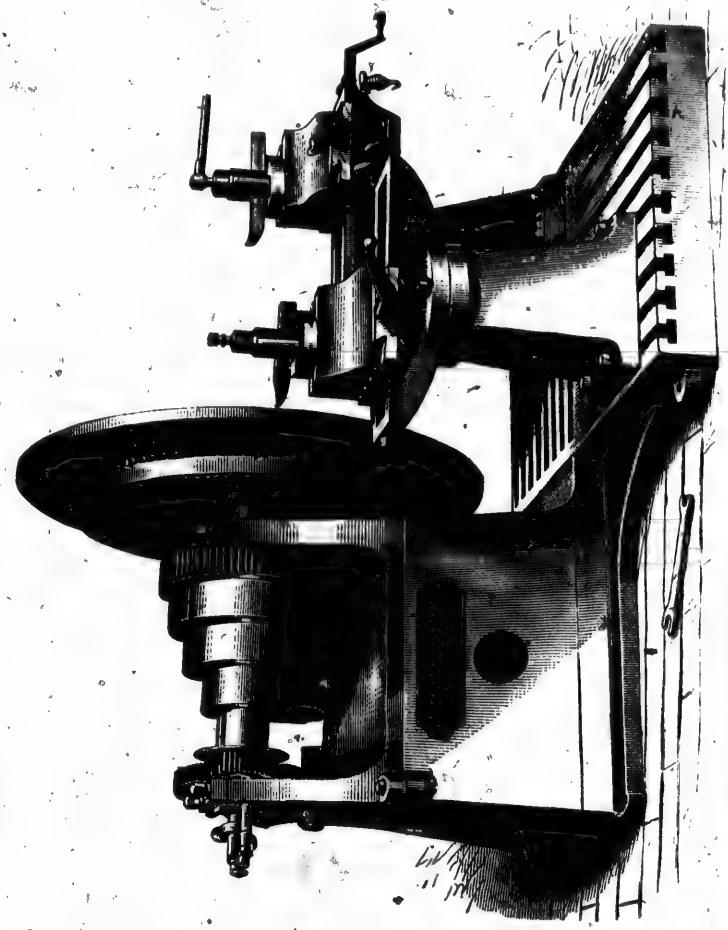
Wood Turning Lathes.

These lathes are very much improved over the old styles of wood lathe. They are finished in the best possible manner and well balanced, so as to run at a high speed.

The headstocks are strong and heavy. The swing is 20 and 24 inches.

The spindle is steel, running in bearings at both ends with compensating screw at back. The running and tail block spindles are bored tapering for the reception of centres when a mandrel is used.

We furnish with each lathe one face plate, one bell chuck, one pair of centres, a socket with rests, countershaft and hangers, with iron cone to match that on head balanced, and bolts for headstocks and rest socket.



No. 1 FACE LATHE, FOR TURNING AND BORING PULLEYS.

Weight, 11,000 Lbs.

Face Lathes for Turning and Boring Pulleys.

These lathes, of which we have two sizes, are specially adapted to the turning and boring of pulleys, facing, and turning large pistons and rings, and no machine shop is complete without such a lathe suited to its capacity. No. 1 consists of a foundation plate cast in one piece and carrying the main head and pedestals with compound slide rests.

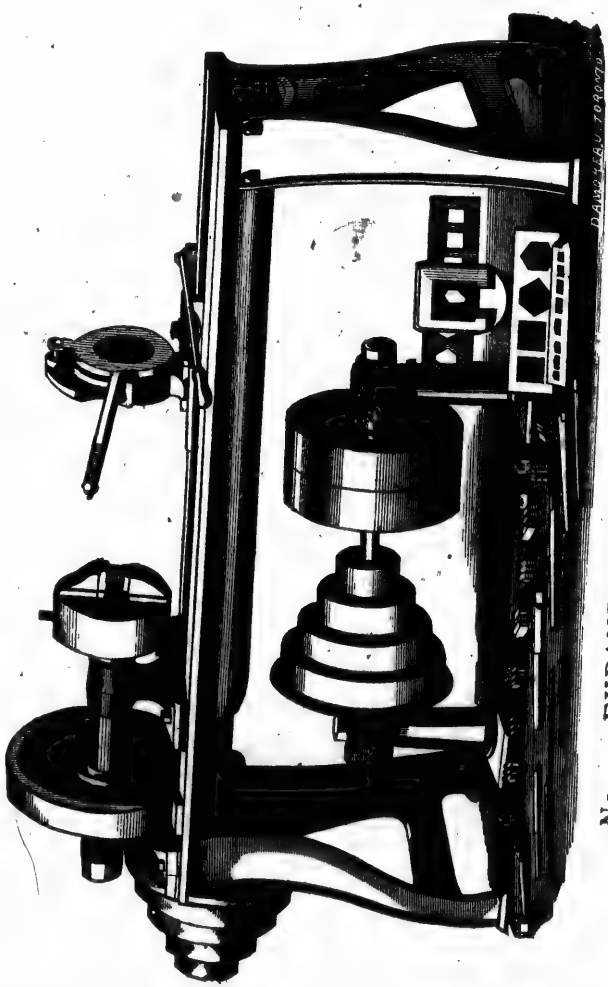
The head is triple geared, the last working into an internal gear on the face plate and imparting strong turning power. The motion can be momentarily changed from triple to single gear.

The spindle is cast-steel, 6½ inches diameter.

The foundation plate is slotted in front of the face plate, and suitable places are provided round it for bolting to stone foundation. Apparatus is furnished for imparting feed motion to the slide rests. This lathe turns a pulley 7 feet diameter and 24 inch face. Weight 11,000 lbs.

No. 2 is of the same style and description as No. 1, working with an internal gear, and turns a pulley 6 feet diameter and 20 inches face. Weight 6,000 lbs.

Pulleys on countershaft	No. 1,	24 in. diam.,	6 in. face,	revolutions 70
" "	No. 2,	18 "	5 "	" 100



No. 2 EXPANDING DIE BOLT CUTTER.

Weight, 1,200 Lbs.

No. 2 Bolt Cutter, with Expanding Dies.

The superiority of this bolt cutter consists in the perfectly clean cut of the thread, with one passage over the iron, the rapidity and ease of its action, uniformity of its work, simplicity and durability.

The arrangement of the dies is such that as soon as they begin to cut they will close as far as the stop will allow them, and the bolts will be cut the same size, any length.

As soon as the bolt is cut its required length, the dies are opened by the lever and the bolts taken out WITHOUT THE NECESSITY OF RUNNING BACK OFF THE THREAD.

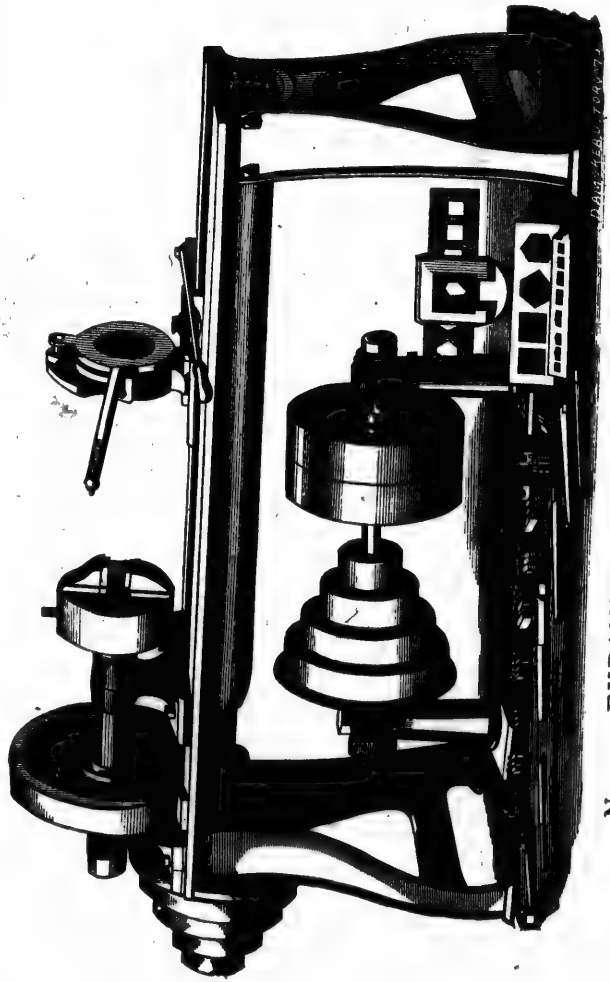
The action of the dies is the same as a lathe tool, taking a clean chip which leaves the thread firm and strong.

The dies can be sharpened by grinding. When too much worn, they can be taken out of the head, re-fitted, re-tempered and re-cut with master taps. In cutting short bolts, we furnish, when ordered, a plug socket, which is placed in the jaws, and which will admit the head of the bolt. In using the socket, it is not necessary to stop the machine to take out or replace the bolt. One socket will answer for all bolts that will admit the head and not allow it to turn.

Besides the ordinary V shaped thread, the machine will cut coach screws, and square threads, double and single, such as vice, piano stool, letter-press and cider mill screws.

The machine will also tap nuts of corresponding sizes to bolts cut.

With it is furnished 8 sets of dies and taps, from 3/8 to 1½ inch, inclusive, and by ordering an additional centre for wider dies it will cut square threads from 3/8 to 1¼ inches. Countershaft and hangers, wrenches and nut holders are provided. Fast and loose pulleys 15 inches diameter and 4 inch face, with 150 revolutions per minute. Weight 1,200 lbs.



No. 3 EXPANDING DIE BOLT CUTTER.

Weight, 1,800 Lbs.

No. 3 Bolt Cutter, with Expanding Dies.

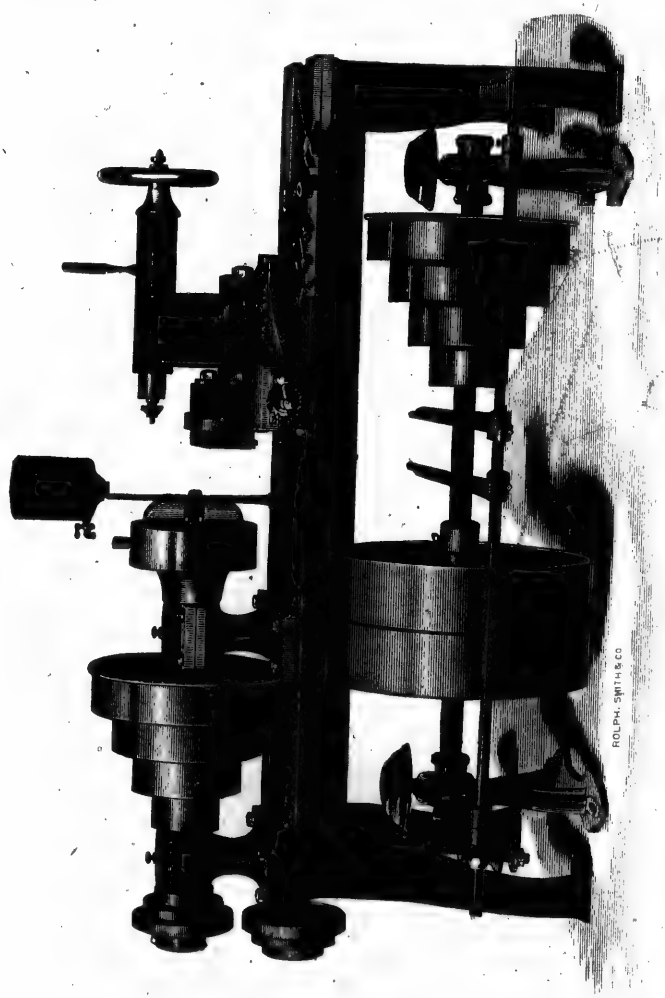
This is of the same style as our No. 2, but much heavier; like the latter it has universal chuck for holding the bolt true while cutting.

The wheel on spindle is large, and cut, ¾ pitch.

The spindle is hollow for taking in bolts or rods of any length. It cuts from ½ to 2 inches inclusive of V threads, and when an additional centre is ordered it cuts square threads from ½ to two inches.

Furnished with it are 8 sets of dies and taps, countershaft and hangers, and apparatus for holding all sizes of nuts, wrenches, &c. Weight 1,800 lbs.

Fast and loose pulleys 18 inches diameter and 4½ inch face. Revolutions per minute 150.



No. 1 CUTTING-OFF AND CENTERING MACHINE.

Weight, 1,600 Lbs.

Cutting-Off and Centering Machines.

No. 1 Machine.

This machine, after a service of eight years, has proved itself the greatest labor saving machine in the workshop. It can cut rapidly steel and iron bars from 2½ inches down. It is arranged with two tools with automatic stop feed and is provided with centering attachment all complete with countershaft, wrenches, etc.

Fast and loose pulleys on countershaft 18 inches diameter and should make 150 revolutions per minute. Weight 1,600 lbs.

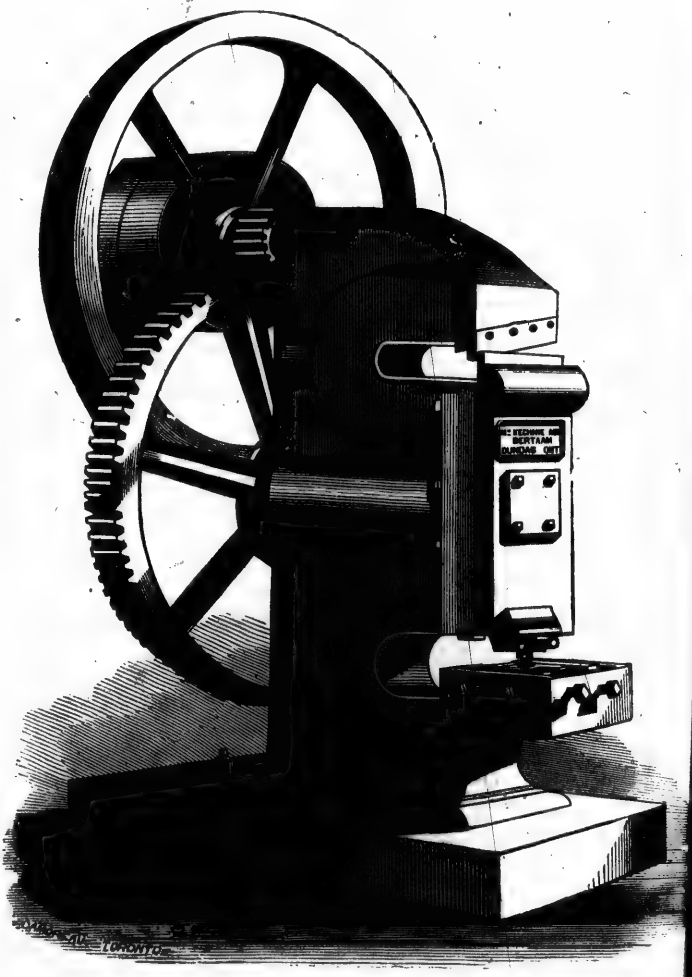
No. 2 Machine.

This machine has been designed specially for cutting off steel and iron bars from 3½ inches down, having the many requisite improvements to make it a machine of high merit. It has automatic feed, has automatic stop motion, is provided with two tools, and is arranged with two universal chucks, all complete with centering attachment, countershaft and wrenches, etc. Photo on application.

Fast and loose pulleys on countershaft 14 x 4½ inches and should make 80 revolutions per minute.

Seven Inch Cutting-Off and Centering Machine.

This machine is of ponderous and extra heavy construction and is capable of cutting off and centering steel or iron bars from 7 inches diameter down to two inches. It is arranged with a universal chuck at each end of spindle, has automatic feed motion on tool and is provided with centering and countersinking attachment all complete. Fast and loose pulleys on countershaft 24 x 6 inches and should make 100 revolutions per minute. Weight, 6,300 lbs. Photo on application.



No. 1 PUNCH AND SHEARS.

Punching and Shearing Machines.

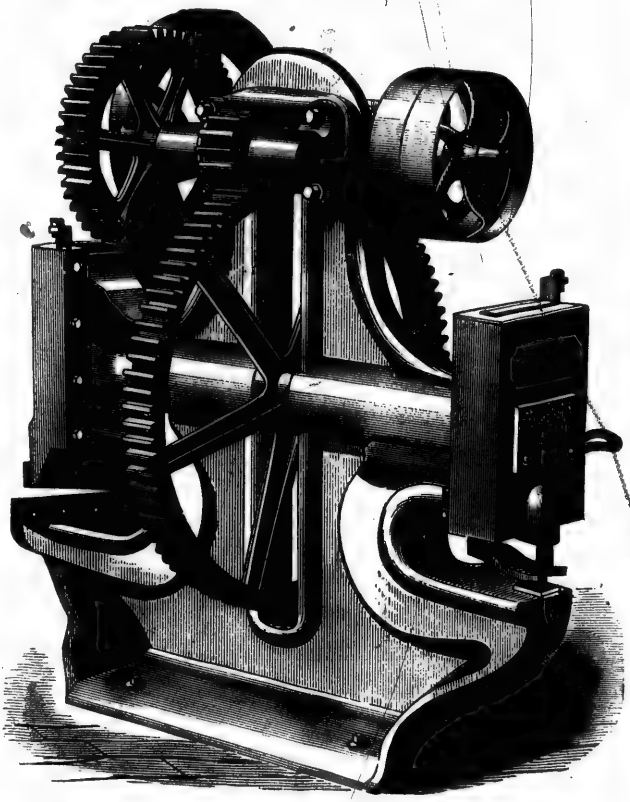
We manufacture in this line of machinery quite a variety of different styles and shapes, both of single and combined machines. If required, photograph of any of these may be had on application.

No. 1 Punch and Shears.

The accompanying cut represents our No. 1 combined punch and shears. It is single geared and can be worked by hand or power. The frame is massive and strong. The eccentric works with a bronze box.

All the parts of this machine are made heavy, to prevent the possibility of spring. It can be made with die block as in the cut, for implement makers, or otherwise for the boiler shop. It cuts and punches 5/8 in. holes and 1/2 in. plate.

Fast and loose pulleys 24 in. diameter, 5 1/2 in. face, revolutions 60. Weight 3,500 lbs.



No 2 COMBINED PUNCH AND SHEARS.

No. 2 Combined Punch and Shears.

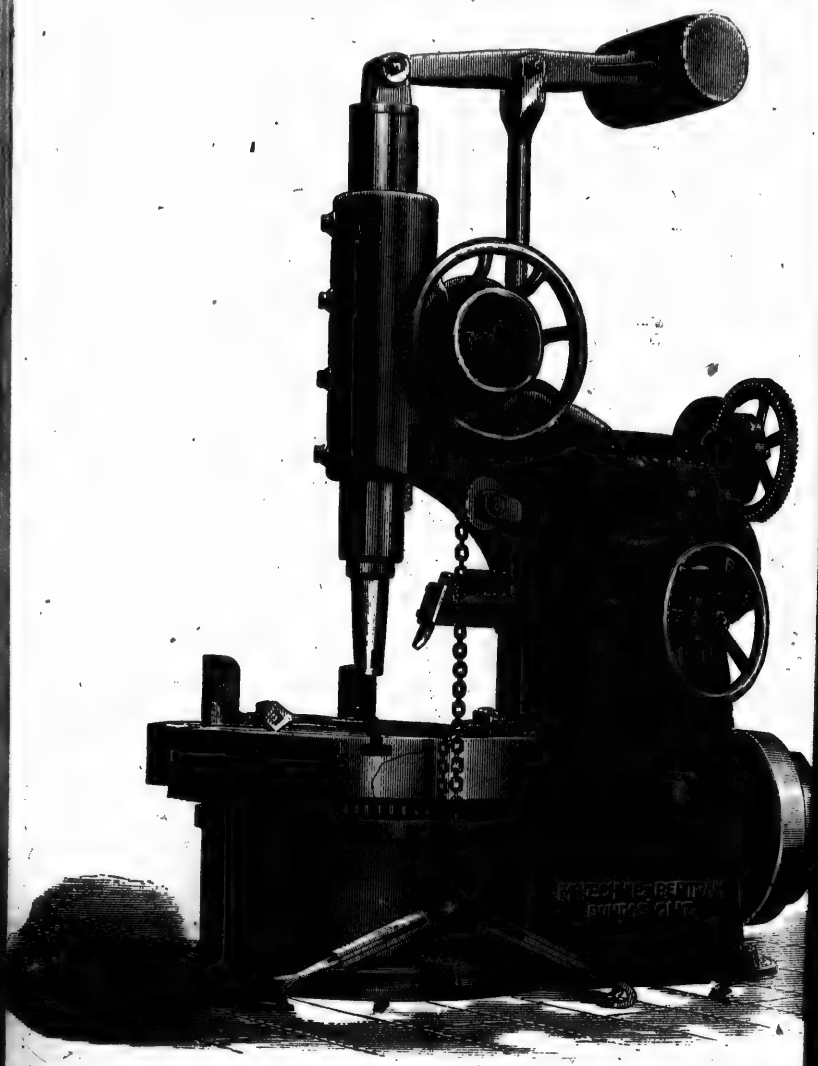
This is a different style from that of No. 1. The punch and shears are on the same level, about 15 inches from the floor and on opposite sides of a heavy cast frame, double gear, with the mainwheel in the centre, so that punching and shearing can be done at the same time without interference.

The jaw is extra heavy, being 12 inches across. In punching, the operator can, by withdrawing a slide, stop the punch instantly. This machine shears ⅝ inch plate and punches 1⅛ holes in ½ inch plate.

Fast and loose pulleys 21 inches diameter, 4½ inch face, revolutions 180. Weight 6,600 lbs. Photo on application.

No. 3 Combined Punch and Shears.

This machine is of the latest and most approved style of construction; the frame is cast all in one piece, being of a hollow or cored section. Machine will shear ⅝ inch plate, 12 inches from edge. Fast and loose pulleys 21 x 5 and should make 180 revolutions per minute. Weight 6,100 lbs. Photo on application.



FORTY-TWO INCH CAR WHEEL BORING MACH

Weight, 9,300 Lbs.

Forty-two Inch Car Wheel Boring Machine.

This machine is specially adapted for boring rapidly all classes of car wheels at one cut.

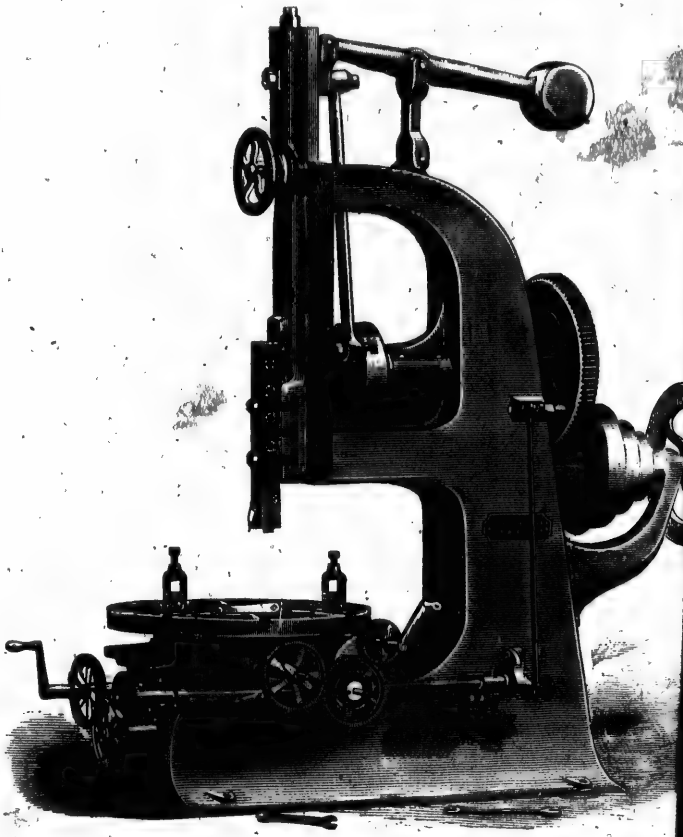
It consists of a strong universal chuck revolving horizontally in a bed piece; from the back of this rises a massive frame of hollow or cored section, carrying a vertical boring bar over the centre of the chuck.

This bar has a cast-steel rack for imparting the feed. The point of this is steel, fitted in a taper socket for carrying the cutters. The movement of the bar is perfectly under the control of the workman, and, being balanced on the top by a lever and weight, the feed can instantly be detached and started at any point.

The feed is of the friction class and is very powerful, finest 1-10 inch, and coarsest ¼ inch. The chuck runs in the Schiele anti-friction bearing.

When required we make this machine with attachment for facing hubs. This consists of a heavy horizontal bar in the frame and operated by an automatic rack feed motion which can be run out of the way while changing wheels.

Attached to the side of frame is a crane for lifting wheels. The cones are large diameter and 5½ inches face. Revolutions per minute, 4. Weight, 9,300 lbs.



IRON SLOTTING MACHINE,

12-INCH STROKE,

Weight, 8,000 Lbs.

Iron Slotting Machines.

Twelve Inch Machine.

This slotter is of a new design and is a strong and substantial tool. The frame consists of a hollow casting with the bed piece all in one. It takes in 52 inches diameter, and 18 inches deep. The stroke is 12 inches, and has Whitworth's quick return motion, only one cut wheel and pinion being used.

The ram is balanced by a lever and weight on top. It has compound slide and circular movement in the table, which are self-acting.

The ram is raised and lowered by a hand wheel and screw within easy reach of the workman, and the length of the stroke can be altered by a screw in the crank plate. All the movements in the table can be made from one side. All the gear on motion and feed are cut.

Countershaft pulleys 21 inches diameter and 4½ face. Revolutions per minute, 120. Weight, 8,000 lbs

Eight Inch Machine.

This machine is similar to the above, and is an excellent tool. Machine has a stroke of 8 inches, will take in 40 inches in diameter and 18 inches in depth, and has automatic feeds in all directions. Fast and loose pulleys on countershaft 18 x 4½ inches, and should make 140 revolutions per minute. Weight, 3,900 lbs. Photo on application.

Sixteen Inch Machine.

This machine is similar to the two above machines, but of much heavier construction, being particularly adapted for doing locomotive and other heavy work. Machine has a stroke of 16 inches, will take in diameter 70 inches and in depth 26 inches, and has automatic feeds in all directions. Fast and loose pulleys on countershaft 30 x 6 inches, and should make 120 revolutions per minute. Weight, 13,600 lbs. Photo on application.

Plate Bending Machines.

Hand Power Bending Rolls.

This machine is of invaluable service to all boiler-makers etc., and is a very complete machine. The rolls are arranged in pyramidal form, are 6 inches in diameter and will bend ½ inch plates 6 feet in length. This machine is of first-class material, workmanship and finish, and will accomplish with ease a vast amount of work.

Power Bending Rolls.

We also manufacture a large variety of power bending rolls, which are of the latest and improved patterns, and of which photo's and descriptions can be had on application.

Steam Hammers.

Three Cwt. Steam Hammer.

This hammer is of the latest and most approved style of construction, and is modeled principally on the Rigby plan.

It consists of a frame of hollow or cored section, with anvil seat of great weight.

Steam is admitted at both ends of the cylinder; the piston rod and piston are forged of a solid piece of wrought iron; the valve seat is brass lined, and the hammer head is of cast-steel.

All the parts of this hammer are heavy, well adapted to stand the strain of working, and in case of repairing can be easily removed.

We also manufacture a steam hammer of much larger capacity, viz., 7 cwt.

It is of the same construction as our smaller hammer, excepting the anvil block, which, instead of being cast solid on the frame, is a separate piece of itself, lying directly beneath the head of hammer, thereby preventing the shock of the blow from communicating itself to the main frame.

These hammers are simple and very effective and dispense with a very large amount of labor.

Weight of 3 cwt. steam hammer, 3,400 lbs. Weight of 7 cwt steam hammer, 8,200 lbs. Weight of anvil block for 7 cwt. hammer, 3,800.

CONCLUSION:

BESIDES the many different machines enumerated and described in this Catalogue, we also manufacture and supply complete outfits of machinery for

Railway Machine Shops,
Locomotive Builders, Car Builders,
Implement Manufacturers,
Bridge Works, Planing Factories,
Etc., Etc.,

besides many special and valuable tools hitherto not mentioned, photographs and descriptions of all of which may be had on application.

JOHN BERTRAM & SONS.

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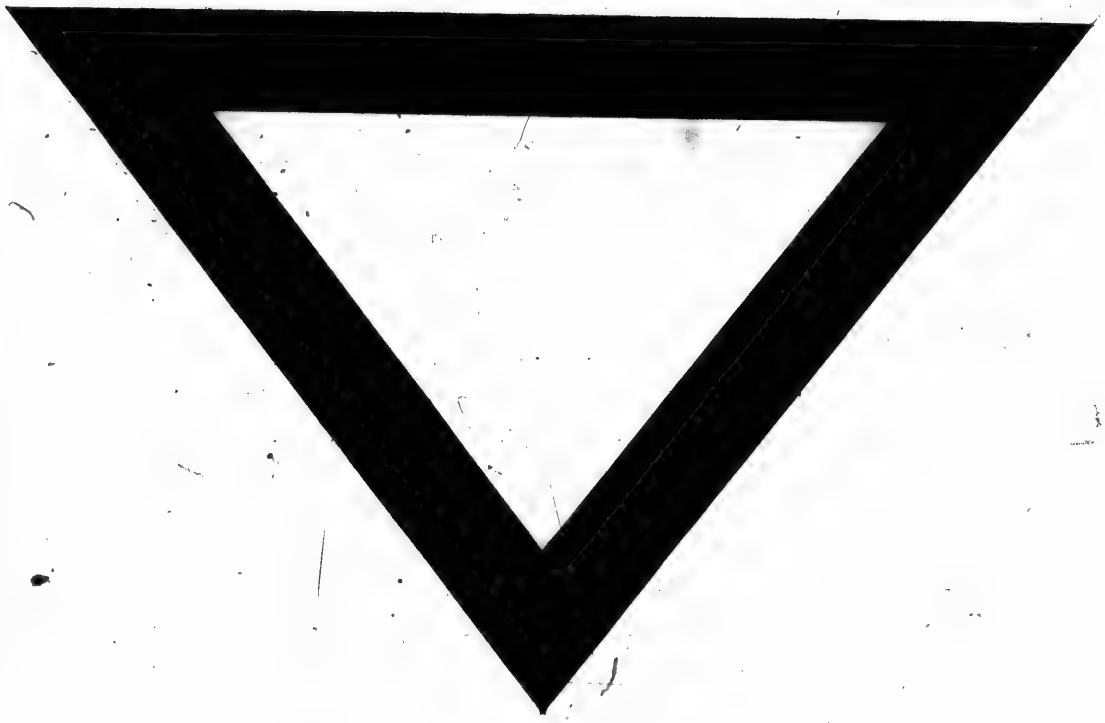
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